

Building Act 1993
Building Regulations 2006
Regulations 1507 and 1506

CERTIFICATE OF COMPLIANCE

To: Ari Akritidis
C/O Akritidis Group

Address: Suite 302, 3 Chester Street, Oakleigh 3166

From Structerre at 3 Codrington St, Cranbourne, 3977

PROPERTY DETAILS

No. 4 Florida Avenue
Suburb Beaumaris

COMPLIANCE

I have prepared the design and certify that the part of the design described as

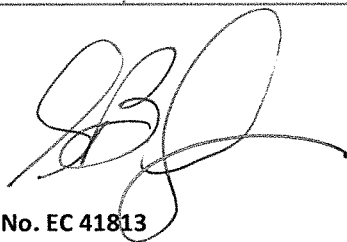
Proposed Single Story dwelling design

Complies with the provisions of the Regulations and the BCA.

BCA Vols. 1 & 2 2014, AS 1170 (Parts 1 & 2), AS 1684, AS 1720, AS 2870, AS 3600, AS 3700, AS 4100, AS 4600, AS 4773 and NASH Standard

DESIGN DOCUMENTS		PREPARED BY	DATE
Drawing No.s	Job No. F14190, Structerre Dwgs. Rev. A 000, Rev. D 001, Rev. A 002, 003, 010, Rev B 011, Rev D 020, Rev B 021, Rev. D 030, 031, Rev. A 032, 040, 041, 042 & 050	HAV	January / February 15
Specifications			
Computations	F14190 pgs. 1 - 39	BRN	5 February 15
Test Reports	Site Classification Report, Ref. No. 14H006	Southern Geotechnical Pty Ltd	6 August 14
Other Documentation			

Signature



Date 17/02/15

Registration No. EC 41813

Signed Building Practitioner Stuart Bridger.

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Permit No.: 20150189/0
Issue Date: 25/02/2015


Ari Akritidis
BS-U 1573

INSPECTION BOOKINGS: 95682992

ACN 155 811 957. EC 20497

~ 3 Codrington Street (Corner Sladen Street), Cranbourne, VIC 3977
~Ph: (03) 5996 2555 ~ Fax: (03) 5996 8845 ~ E: melbourne@structerre.com.au

PROJECT : Proposed Single Storey Dwelling
CLIENT : Mr. Greg Lord
ADDRESS : 4 Florida Avenue, Beaumaris

DATE : 05-Feb-15
ENGINEER : BRN
PAGE : 0 of 39
JOB No. : F14190

REFERENCE CODES

AS 1170.0 General Principles
AS 1170.1 Structural Design Actions
AS 1170.2 Wind Actions
AS 1684 Residential timber framing code
AS 1720 Timber structures
AS 2870 Residential slabs & footings
AS 3600 Concrete Structures
AS 3700 Masonry structures
AS 4100 Steel structures
AS 4600 Cold-formed Steel Structures
AS 4773 Masonry for small buildings
 NASH Standard
 BCA Vol 1 & 2

These computations have been prepared to indicate design intent. Where appropriate and necessary, shop drawings describing the detailed construction proposals shall be prepared and submitted to the Design Engineer for approval. These computations must be reproduced in full and not altered in any way.

ENGINEER : Stuart Bridger
 B.Eng. (Civil)

CHECKER : SB
SUPERVISOR :

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WA | QLD | NSW | VIC

Melbourne Office: 3 Codrington Street, Cranbourne, Melbourne, Victoria 3977

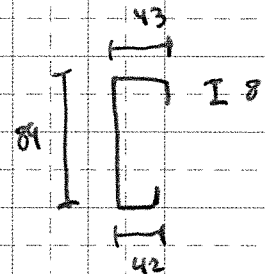
Phone (+613) 5996 2555 | Fax (+613) 5996 8845 | Email melbourne@structerre.com.au | Web www.structerre.com.au

ADDRESS: 4 FLORIDA AV. BEAUMARIS	PROJ #: F14190	DES: BRN	DATE: 13/01/15
CLIENT: G. LORD	SHT #: 1 of 39	CHK: SB	DATE: 20/1/15
CALCULATION: STEEL WALL FRAME			COMMENTS / REF

N3 WIND CLASS
STEEL ROOF TRUSS @ 900 cc
6.4m RLW
HEIGHT = 2.75m
STUD SPACING = 450 cc

EXTERNAL VERTICAL STUD

89 x 43 x 0.95 C550



POINT LOAD FROM ROOF

$$G = 0.23 \text{ kPa} \times 6.4 \text{ m} \times 0.9 \text{ m} = 1.32 \text{ kN}$$

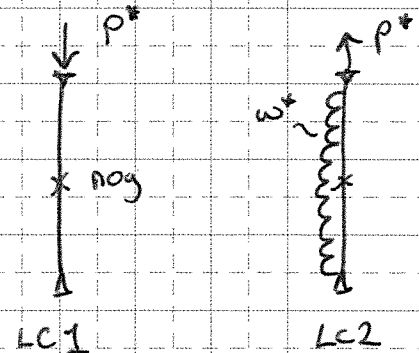
$$Q = 0.25 \text{ kPa} \times 6.4 \text{ m} \times 0.9 \text{ m} = 1.44 \text{ kN}$$

$$(N3) W_{up} = -1.49 \text{ kPa} \times 6.4 \text{ m} \times 0.9 \text{ m} = -8.58 \text{ kN}$$

$$(N3) \text{ WINDOWARD} = 1.35 \text{ kPa} \times 0.45 \text{ m} = 0.61 \text{ kN/m}$$

$$LC1 = 1.2G + 1.5Q$$

$$LC2 = 0.9G + W_{up} + \text{WINDOWARD PRESSURE}$$



$$LC1: P^* = 1.2 \times 1.32 + 1.5 \times 1.44 = 3.74 \text{ kN (C)}$$

$$P^* \leq \phi N (17.92 \text{ kN}) \therefore \text{OK}$$

$$LC2: P^* = 0.9 \times 1.32 - 8.58 = -7.392 \text{ kN (T)}$$

$$w^* = 0.61 \text{ kN/m}$$

$$m^* = 0.61 \times \frac{2.75^2}{8} = 0.58 \text{ kNm}$$

$$\phi M = 1.32 > m^* \therefore \text{OK}$$

$$\phi N = 17.92 > P^* \therefore \text{OK}$$

$$\text{combined bending \& tension} = 0.54 < 1.0 \therefore \text{OK}$$

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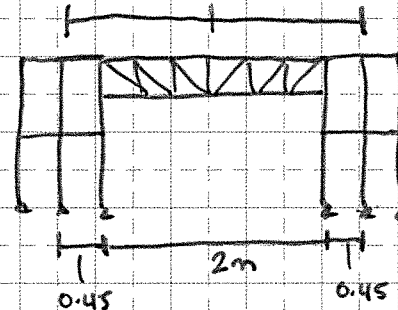
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ADDRESS: 4 FLORIDA AV. BEAUMARIS	PROJ #: F14190	DES: BRN	DATE: 13/01/15
CLIENT: G. LORD	SHT #: 2 of 39	CHK: SB	DATE: 20/1/15
CALCULATION: STEEL WALL FRAME			COMMENTS / REF

EXTERNAL STUDS TO SIDES OF OPENING

UP TO 2m OPENING
DOUBLE 89x43x0.95 Q550



$$G = 0.23 \text{ kPa} \times 6.4 \text{ m} \times 1.23 \text{ m} = 1.81 \text{ kN}$$

$$Q = 0.25 \text{ kPa} \times 6.4 \text{ m} \times 1.23 \text{ m} = 1.97 \text{ kN}$$

$$(0.45 \text{ m} + 2 \text{ m}) / 2 = 1.23 \text{ m}$$

$$(N3) W_{op} = -1.49 \text{ kPa} \times 6.4 \text{ m} \times 1.23 \text{ m} = 11.73 \text{ kN}$$

$$(N3) \text{ WINDWARD} = 1.35 \text{ kPa} \times 1.23 \text{ m} = 1.66 \text{ kN/m}$$

$$LC1 = 1.2G + 1.5Q$$

$$LC2 = 0.9G + W_{op} + \text{windward}$$

$$LC1 \Rightarrow P^* = 1.2 \times 1.81 + 1.5 \times 1.97 = 5.13 \text{ kN (c)}$$

$$\phi N (\text{DOUBLE STUD}) = 17.92 \times 2 = 35.84 \text{ kN} > P^* \therefore \text{OK}$$

$$LC2 \Rightarrow P^* = 0.9 \times 1.81 - 11.73 = -10.1 \text{ kN (t)}$$

$$w^* = 1.66 \text{ kN/m}$$

$$M^* = 1.66 \times \frac{2.75^2}{8} = 1.57 \text{ kNm}$$

$$\phi M = 2 \times 1.32 = 2.65 \text{ kNm} > M^* \therefore \text{OK}$$

$$\phi N = 35.84 \text{ kN} > P^* \therefore \text{OK}$$

$$\text{combined bending \& tension} = 1.32 < 2.0 \therefore \text{OK}$$

ADOPT DOUBLE STUD TO SIDES OF OPENINGS UP TO 2m

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ADDRESS: 4 FLORIDA AV. BEAUMARKS	PROJ #: F14190	DES: BRN	DATE: 13/01/15
CLIENT: G. LORD	SHT #: 3 of 39	CHK: AB	DATE: 10/1/15
CALCULATION: STEEL WALL FRAME			COMMENTS / REF

UP TO 4m OPENING (TRIPLE STUD) $\frac{4m + 0.45m}{2} = 2.23m$

$$G = 0.23kPa \times 6.4m \times 2.23m = 3.28 kN$$

$$Q = 0.25kPa \times 6.4m \times 2.23m = 3.57 kN$$

$$(N3) W_{op} = -1.49kPa \times 6.4m \times 2.23m = -21.27 kN$$

$$(N3) windward = 1.35kPa \times 2.23m = 3.01 kN/m$$

$$LC1 \Rightarrow P^* = 1.2 \times 3.28 + 1.5 \times 3.57 = 9.29 kN (C)$$

$$\phi N = 17.92 \times 3 = 53.76 kN > P^* \therefore OK$$

$$LC2 \Rightarrow P^* = 0.9 \times 3.28 - 21.27 = -18.32 kN (T)$$

$$W^* = 3.01 kN/m$$

$$M^* = 3.01 \times \frac{2.23^2}{8} = 2.85 kNm$$

$$\phi M = 3.97 kNm > M^* \therefore OK$$

$$combined bending + tension = 2.4 < 3.0 \therefore OK$$

ADOPT TRIPLE STUD TO SIDES OF OPENING
UP TO 4m

1 M12 RANSET W/EMSET RED 502 GRADE 5.8 ANCHORS STUD
WITH 90mm EMBEDMENT DEPTH

$$28kN \times 0.91 = 25.48 kN$$

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HOLD DOWN CAPACITY.

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CLIENT: G. LORD	SHT #: 4 of 39	CHK: JB	DATE: 20/1/15
CALCULATION: STEEL WALL FRAME			COMMENTS / REF

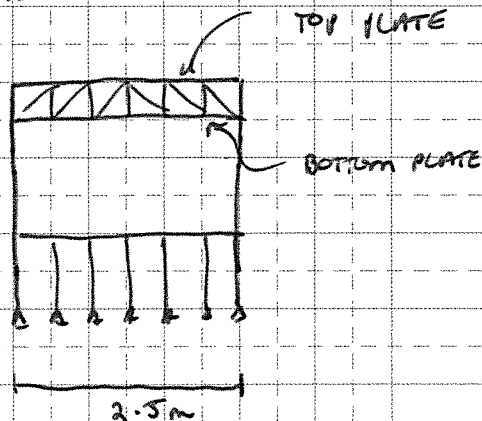
WINDOW HEAD BOTTOM PLATE & TOP PLATE

UP TO 2500 OPENING

$$G = 0.23 \text{ kPa} \times 6.4 \text{ m} = 1.472 \text{ kN/m}$$

$$Q = 0.25 \text{ kPa} \times 6.4 \text{ m} = 1.6 \text{ kN/m}$$

$$(N3) W_{up} = -1.49 \text{ kPa} \times 6.4 \text{ m} = 9.54 \text{ kN/m}$$



$$LC1 = G + 0.6Q \Rightarrow 2.432 \text{ kN/m}$$

$$LC2 = 1.2G + 1.5Q \Rightarrow 4.166 \text{ kN/m}$$

$$LC3 = 0.9G + W_{up} \Rightarrow -8.22 \text{ kN/m}$$

INPUT INTO MULTIFRAME

TOP PLATE

$$1.2G + 1.5Q$$

$$N^* = 10.164 \text{ kN (C)}$$

$$M_y^* = 0.03 \text{ kNm}$$

$$l_{ex} = 0.9 \text{ m (dist b/w roof trusses)}$$

$$l_{ey} = 0.6 \text{ m (dist b/w web)}$$

589.095

Single stud OK

$$0.9G + W_{up}$$

$$N^* = 20.04 \text{ kN (T)}$$

$$M_y^* = 0.06 \text{ kNm}$$

$$l_{ex} = 0.9 \text{ m}$$

$$l_{ey} = 0.6 \text{ m}$$

ADOPT SINGLE 589.095 STUD AS TOP PLATE.

CHECK BOTTOM PLATE.

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CLIENT: G. LORD	SHT #: 5 of 39	CHK: 88	DATE: 20/1/15
CALCULATION: STEEL WALL FRAME			COMMENTS / REF

BOTTOM PLATE

1.24 + 1.52

$$N^* = 10.832 \text{ kN (T)}$$

$$M_y^* = 0.013 \text{ kNm}$$

$$L_{ex} = 2.5 \text{ m opening}$$

$$L_{ey} = 0.6 \text{ m dist b/w web}$$

Single stud ok

0.96 + 1.04

$$N^* = 21.36 \text{ kN (c)}$$

$$M_y^* = 0.026 \text{ kNm}$$

$$L_{ex} = 2.5 \text{ m}$$

$$L_{ey} = 0.6$$

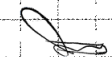
Single stud ok

ADOPT SINGLE S87.005 STUD AS BOTTOM PLATE

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CLIENT: G. LORD	SHT #: 6 of 39	CHK: JB	DATE: 20/1/15
CALCULATION: STEEL WALL FRAMING			COMMENTS / REF

UP TO 3500 OPENING

TOP PLATE

$$1.2G + 1.5Q \quad N^* = 20.21 \text{ kN (c)}$$

$$M_y^* = 0.04 \text{ kNm}$$

$$L_{ex} = 0.9 \text{ m}$$

$$L_{ey} = 0.6 \text{ m}$$

Single stud ok

$$0.9G + W_{up} \quad N^* = 39.85 \text{ kN (T)}$$

$$M_y^* = 0.08 \text{ kNm}$$

$$L_{ex} = 0.9 \text{ m}$$

$$L_{ey} = 0.6 \text{ m}$$

Single stud ok

ADOPT S89.95 STUD AS TOP PLATE

BOTTOM PLATE

$$1.2G + 1.5Q \quad N^* = 20.2 \text{ kN (T)}$$

$$M_y^* = 0.023 \text{ kNm}$$

$$L_{ex} = 3.5 \text{ m}$$

$$L_{ey} = 0.6 \text{ m}$$

Double stud ok

$$0.9G + W_{up}$$

$$N^* = 38.824 \text{ kN (c)}$$

$$M_y^* = 0.043 \text{ kNm}$$

$$L_{ex} = 3.5 \text{ m}$$

$$L_{ey} = 0.6 \text{ m}$$

ADOPT DOUBLE STUD AS BOTTOM PLATE

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ADDRESS: 4 FLORIDA AV. DENHAMAS	PROJ #: F14190	DES: BLN	DATE: 13 / 09 / 15
CLIENT: G. LORO	SHT #: 7 of 39	CHK: SB	DATE: 20 / 1 / 15
CALCULATION: STEEL WALL FRAME			COMMENTS / REF

UP TO 6000mm OPENING

TYPE A

TYPE B

TOP PLATE
1.2G + 1.5Q

$$N^* = 46.66 \text{ kN (C)}$$

$$M_y^* = 0.047 \text{ kNm}$$

double steel ok

$$l_{ex} = 0.9 \text{ m}$$

$$l_{ey} = 0.6 \text{ m}$$

0.9G + Wip

$$N^* = 92 \text{ kN (T)}$$

$$M_y^* = 0.093 \text{ kNm}$$

double steel ok

$$l_{ex} = 0.9 \text{ m}$$

$$l_{ey} = 0.6 \text{ m}$$

ADAPT DOUBLE STEEL AS TOP PLATE

BOTTOM PLATE

1.2G + 1.5Q

$$N^* = 47.72 \text{ kN (T)}$$

$$M_y^* = 1.59 \text{ kNm}$$

$$l_{ex} = 6.0 \text{ m}$$

$$l_{ey} = 0.6 \text{ m}$$

$$N^* = 47.163 \text{ kN (T)}$$

$$M_y^* = 0.227 \text{ kNm}$$

$$l_{ex} = 6.0 \text{ m}$$

$$l_{ey} = 0.6 \text{ m}$$

0.9G + Wip

$$N^* = 93 \text{ kN (C)}$$

$$M_y^* = 4.29$$

$$l_{ex} = 6.0 \text{ m}$$

$$l_{ey} = 0.6 \text{ m}$$

$$N^* = 93 \text{ kNm (C)}$$

$$M_y^* = 4.29$$

$$l_{ex} = 6.0 \text{ m}$$

$$l_{ey}$$

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89x89x6.0 SHS AS BOTTOM PLATE

ADDRESS: 4 FLORIDA AV BEAUMARIS	PROJ #: F14190	DES: BRN	DATE: 13/01/15
CLIENT: GREG LORD	SHT #: 8 of 39	CHK: JB	DATE: 19/1/15
CALCULATION: UPPER ROOF			COMMENTS / REF

REGION A CATEGORY 1-S

$$M_{zcat} = 1.02$$

$$V_{sit} \text{ ULS} = 45.9 \text{ m/s}$$

$$V_{sit} \text{ SLS} = 37.74 \text{ m/s}$$

$$q = 0.6 \times \frac{45.9^2}{1000} = 1.26 \text{ kPa} \quad \text{ULS}$$

$$q = 0.6 \times \frac{37.74^2}{1000} = 0.85 \text{ kPa} \quad \text{SLS}$$

LIVING AREA EXTERNAL WALL (WTI):

$$RLW = 5.2\text{m} + 1.4\text{m} = 6.6\text{m}$$

$$G = 0.2 \text{ kPa} \quad (\text{steel roof})$$

$$Q = 0.25 \text{ kPa}$$

$$W_{up} = 1.26 \text{ kPa} \times 0.81 \times -1.1 = -1.11 \text{ kPa} \quad \text{uplift ULS}$$

$$= 0.85 \times 0.81 \times -1.1 = -0.75 \text{ kPa} \quad \text{uplift SLS}$$

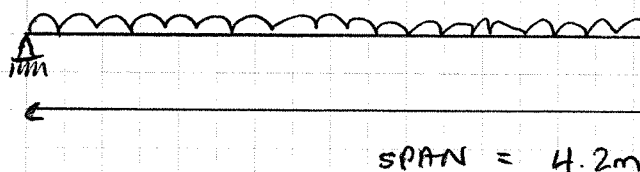
$$LC1 = 1.2G + 1.5Q \Rightarrow 4.06 \text{ kN/m} \quad m^* \leq \phi m$$

$$LC2 = 0.9G + W_{up} \Rightarrow -6.14 \text{ kN/m} \quad m^* \leq \phi m$$

$$LC3 = G \Rightarrow 1.32 \text{ kN/m} \quad \delta^* \leq L/300$$

$$LC4 = W_{up} \text{ SLS} \Rightarrow -4.95 \text{ kN/m} \quad \delta^* \leq L/500$$

RBI:

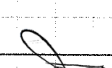


$$(K_a = 0.9 \quad K_c = 0.9)$$

 refer to
 attached
 spreadsheet
 for results

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ph: (08) 9205 4500 fax: (08) 9205 4501
email: info@structerre.com.au
JOB ADDRESS:

GENERAL STEEL BEAM DESIGN
TO AS4100-1998

Issued: XX/XX/2010

RB1

CLIENT:

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GENERAL STEEL BEAM DESIGN TO AS4100

USER INPUT

Member Configuration:

N° of spans: 1 span

Span lengths (m):

Span 1
4.200

DESIGN LOADS AND MEMBER ACTIONS

DISTRIBUTED LOADS

				Load widths/heights (m)					
Dead Loads:		Load:		Span 1	Span 2	Span 3	w_1 (kN/m)	w_2 (kN/m)	w_3 (kN/m)
Timber Floor	↕	0.800	kPa *	0.000			0.000		
Roof Tiled	↕	0.900	kPa *	0.000			0.000		
172 (2c) Conc	↕	4.128	kPa *	0.000			0.000		
Roof Steel	↕	0.400	kPa *	0.000			0.000		
Additional Load		0.20	kPa *	6.600			1.320		
Self weight of member		17.70	kg/m	1.000			0.174		
							1.494		

				Load widths/heights (m)					
Live Loads:		Load:		Span 1	Span 2	Span 3	w_1 (kN/m)	w_2 (kN/m)	w_3 (kN/m)
Roof	↕	0.250	kPa *	0.000			0.000		
Floor (homes)	↕	1.500	kPa *	0.000			0.000		
Balcony (homes)	↕	2.000	kPa *	0.000			0.000		
Additional Load		-1.11	kPa *	6.600			-7.326		
							-7.326		

POINT LOADS

Dead Loads:		Concentrated Dead Load from RB5			Live Loads:				
		Span 1	Span 2	Span 3			Span 1	Span 2	Span 3
P_1 (kN)		0.000			P_1 (kN)		0.000		
P_2 (kN)		0.000			P_2 (kN)		0.000		
P_3 (kN)		0.000			P_3 (kN)		0.000		

DESIGN LOAD CASES

Design Load Cases:	
Ultimate (ULS)	0.9G; Wind
Serviceability (SLS)	Wup sls

Distributed Loads:			
Load Cases	w_1^* (kN/m)	w_2^* (kN/m)	w_3^* (kN/m)
ULS	-5.982		
SLS	-4.945		

Point Loads:

ULS:	Span 1		Span 2		Span 3	
	a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
P_1 (kN)	0.000	0.000				
P_2 (kN)	0.000	0.000				
P_3 (kN)	0.000	0.000				

SLS:	Span 1		Span 2		Span 3	
	a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
P_1 (kN)	0.000	0.000				
P_2 (kN)	0.000	0.000				
P_3 (kN)	0.000	0.000				

MATERIAL & SECTION PROPERTIES AND ANALYSIS RESULTS

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RB1

Section: 150 PFC

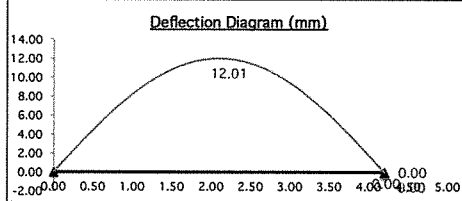
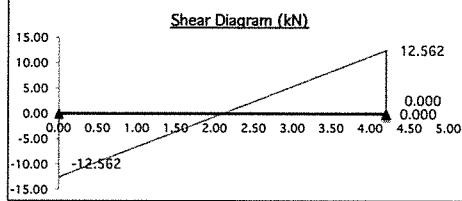
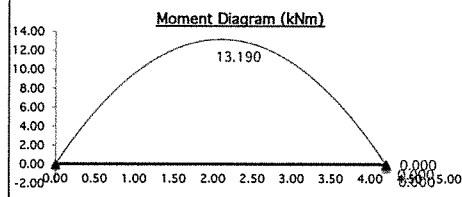
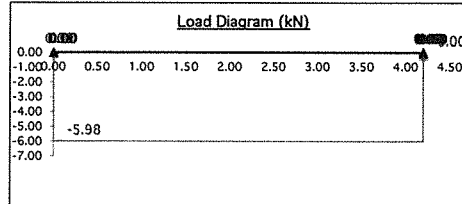
Designation	150 PFC
Mass per m (kg/m)	17.70
d (mm)	150.00
b _f (mm)	75.00
t _f (mm)	9.50
t _w (mm)	6.00
r ₁ (mm)	10.00
r _{ext} (mm)	-
d ₁ (mm)	131.00
d ₁ /t _w	21.80
(b _f -t _w)/2t _f	7.26
A _g (mm ²)	2,250
J (mm ⁴)	54,900
I _w (mm ⁴)	4.59E+09
Form factor (k _t)	1
Flange f _y (MPa)	320
Web f _y (MPa)	320
E (MPa)	200,000
G (MPa)	80,000

About x-axis:

I _x (mm ⁴)	8.34E+06
Z _x (mm ³)	111,000
S _x (mm ³)	129,000
r _x (mm)	60.8
Compactness	-
Z _{xx} (mm ³)	129,000

About y-axis:

I _y (mm ⁴)	1.29E+06
Z _y (mm ³)	25,700
S _y (mm ³)	46,000
r _y (mm)	23.9
Compactness	-
Z _{yy} (mm ³)	38,500



Design Moments:	
Load case:	0.9G; Wind
Design Span:	Span 1
M* ₂	9.892 kNm
M* ₃	13.190 kNm
M* ₄	9.892 kNm
M* _m	13.190 kNm

Design Shear Forces & Reactions:	
Design Span:	Span 1
V* _{left}	-12.562 kN
V* _{right}	12.562 kN
V* _{max}	12.562 kN
R ₁	-12.562 kN
R ₂	-12.562 kN
R ₃	0.000 kN
R ₄	0.000 kN

Maximum Deflections:	
Load case:	#REF!
Span 1	12.01 mm
Span 2	0.00 mm
Span 3	0.00 mm

DESIGN CRITERIA

Effective Length Factors:

Twist restraint, k _t	1.10
Load height, k _l	1.40
Lateral rotation, k _r	1.00
Segment length, l	4.20
Effective length (L _e)	6.47

Deflection Limits:

Mid-span deflection:		Overhang deflection:	
L/δ _{Allowable}	150.00	L/δ _{Allowable}	150.00
δ _{MAX}	20.00	δ _{MAX}	20.00
δ _{LMIT} (mm)	20.00	δ _{LMIT} (mm)	20.00

Bearing and Shear Input:

Bearing length, δ _e (mm)	90.00
b _e (mm)	0.00
Splayed depth (mm)	0.00

Moments for Calculation of α_m:

M* _m (kNm)	13.190
M* ₂ (kNm)	9.892
M* ₃ (kNm)	13.190
M* ₄ (kNm)	9.892

or

α _{m, manual}	0.00
β _{m, manual}	-1.00

NO USER INPUT REQUIRED BELOW THIS ROW

SUMMARY

BENDING STRENGTH:

oM _{xx}	37.152 kNm	>	13.190 kNm	O.K.
oM _{yy}	14.239 kNm	>	13.190 kNm	O.K.

WEB SHEAR STRENGTH:

oV _a	135.821 kN	>	12.562 kN	O.K.
oV _m	135.821 kN	>	12.562 kN	O.K.

WEB BEARING STRENGTH:

oR _{by}	245.700 kN	>	6.280 kN	O.K.
oR _{bb}	227.610 kN	>	0.000 kN	O.K.

SERVICEABILITY:

Span 1 δ _{MAX}	12.012 mm	<	20.000 mm	O.K.
Span 2 δ _{MAX}				
Span 3 δ _{MAX}				

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uplift
check gravity
load casePermit No.: 20150189/0
Issue Date: 25/02/2015Ari Akritidis
BS-U 1573

INSPECTION BOOKINGS: 95682992

 1 Erindale Road Balcatta W.A. 6021 ph: (08) 9205 4500 fax: (08) 9205 4501 email: info@structerre.com.au JOB ADDRESS:	GENERAL STEEL BEAM DESIGN TO AS4100-1998 Issued: XX/XX/2010 RB1 PROJECT No : SHEET No : BY : BRN DATE : THIS SPREADSHEET IS THE INTELLECTUAL PROPERTY OF STRUCTERRE CONSULTING ENGINEERS AND IS PROTECTED BY COPYRIGHT. IT IS UNLAWFUL FOR IT TO BE USED OR COPIED BY OTHER THAN CURRENT EMPLOYEES OR AUTHORISED SUBCONTRACTORS OF STRUCTERRE. THIS SPREADSHEET HAS NOT YET BEEN VERIFIED AND SANCTIONED FOR USE BY THE SPREADSHEET COMMITTEE. THE USER IS THEREFORE RESPONSIBLE FOR ITS VERACITY IT IS ASSUMED THAT YOU, THE USER, ARE SUITABLY FAMILIAR WITH THE MATERIAL, STRUCTURAL DESIGN ISSUES AND PRINCIPLES ASSOCIATED WITH CALCULATIONS THAT THIS SPREADSHEET CARRIES OUT. IF YOU DO NOT FULLY UNDERSTAND THE UNDERLYING PRINCIPLES OR HOW TO USE IT PROPERLY, YOU MUST SEEK ADVICE FROM SOMEONE WHO DOES BEFORE ATTEMPTING TO USE THIS TOOL.
GENERAL STEEL BEAM DESIGN TO AS4100	
USER INPUT	

Member Configuration: N° of spans: 1 span	Span lengths (m): <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Span 1</td> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> </tr> <tr> <td style="text-align: center;">4.200</td> <td> </td> <td> </td> </tr> </table>	Span 1			4.200		
Span 1							
4.200							

DESIGN LOADS AND MEMBER ACTIONS
DISTRIBUTED LOADS

Dead Loads:		Load:		Load widths/heights (m)			w ₁ (kN/m)	w ₂ (kN/m)	w ₃ (kN/m)
				Span 1	Span 2	Span 3			
Timber Floor	↕	0.800	kPa	*	0.000		0.000		
Roof Tiled	↕	0.900	kPa	*	0.000		0.000		
172 (2c) Conc	↕	4.128	kPa	*	0.000		0.000		
Roof Steel	↕	0.400	kPa	*	0.000		0.000		
Additional Load		0.20	kPa	*	6.600		1.320		
Self weight of member		17.70	kg/m		1.000		0.174		
							1.494		

Live Loads:		Load:		Load widths/heights (m)			w ₁ (kN/m)	w ₂ (kN/m)	w ₃ (kN/m)
					Span 1	Span 2	Span 3		
Roof	↕	0.250	kPa	*	6.600			1.650	
Floor (homes)	↕	1.500	kPa	*	0.000			0.000	
Balcony (homes)	↕	2.000	kPa	*	0.000			0.000	
Additional Load		-1.11	kPa	*	0.000			0.000	
								1.650	

POINT LOADS

Dead Loads:		Concentrated Dead Load from RB5			Live Loads:		Concentrated Live Load from RB5		
		Span 1	Span 2	Span 3			Span 1	Span 2	Span 3
P ₁ (kN)		0.000			P ₁ (kN)		0.000		
P ₂ (kN)		0.000			P ₂ (kN)		0.000		
P ₃ (kN)		0.000			P ₃ (kN)		0.000		

DESIGN LOAD CASES

Design Load Cases:		Distributed Loads:			
Ultimate (ULS)	1.2G + 1.5Q	Load Cases	w ₁ * (kN/m)	w ₂ * (kN/m)	w ₃ * (kN/m)
Serviceability (SLS)	G	ULS	4.267		
		SLS	1.494		

Point Loads:		Span 1		Span 2		Span 3	
ULS:		a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
P ₁ (kN)	0.000	0.000	4.200				
P ₂ (kN)	0.000	0.000	4.200				
P ₃ (kN)	0.000	0.000	4.200				

SLS:		Span 1		Span 2		Span 3	
		a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
P ₁ (kN)	0.000	0.000	4.200				
P ₂ (kN)	0.000	0.000	4.200				
P ₃ (kN)	0.000	0.000	4.200				

MATERIAL & SECTION PROPERTIES AND ANALYSIS RESULTS	
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Permit No.: 20150189/0

Issue Date: 25/02/2015

Ari Akritidis
BS-U 1573

INSPECTION BOOKINGS: 95682992

Section: 150 PFC

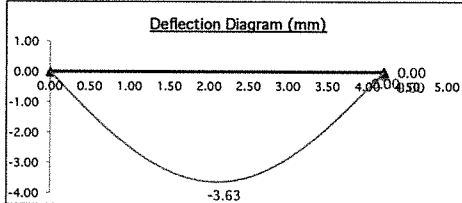
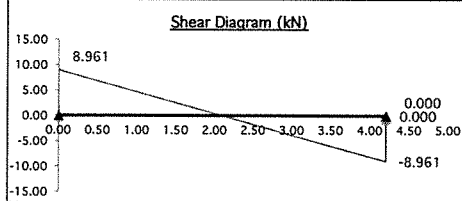
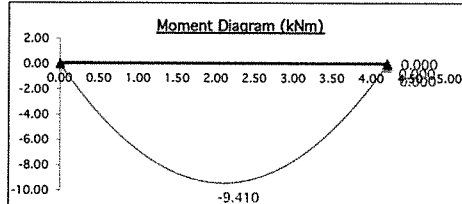
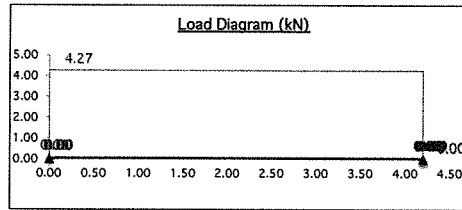
Designation	150 PFC
Mass per m (kg/m)	17.70
d (mm)	150.00
b _f (mm)	75.00
t _f (mm)	9.50
t _w (mm)	6.00
r _f (mm)	10.00
r _{ext} (mm)	-
d ₁ (mm)	131.00
d ₁ /t _w	21.80
(b _f -t _w)/2t _f	7.26
A _g (mm ²)	2,250
J (mm ⁴)	54,900
I _w (mm ⁴)	4.59E+09
Form factor (k _t)	1
Flange f _y (MPa)	320
Web f _y (MPa)	320
E (MPa)	200,000
G (MPa)	80,000

About x-axis:

I _x (mm ⁴)	8.34E+06
Z _x (mm ³)	111,000
S _x (mm ³)	129,000
r _x (mm)	60.8
Compactness	-
Z _{xx} (mm ³)	129,000

About y-axis:

I _y (mm ⁴)	1.29E+06
Z _y (mm ³)	25,700
S _y (mm ³)	46,000
r _y (mm)	23.9
Compactness	-
Z _{yy} (mm ³)	38,500



Design Moments:	
Load case:	1.2G + 1.5Q
Design Span:	Span 1
M* ₂	-7.057 kNm
M* ₃	-9.410 kNm
M* ₄	-7.057 kNm
M* _m	-9.410 kNm

Design Shear Forces & Reactions:	
Design Span:	Span 1
V* _{left}	8.961 kN
V* _{right}	-8.961 kN
V* _{max}	8.961 kN
R ₁	8.961 kN
R ₂	8.961 kN
R ₃	0.000 kN
R ₄	0.000 kN

Maximum Deflections:	
Load case:	G
Span 1	-3.63 mm
Span 2	0.00 mm
Span 3	0.00 mm

DESIGN CRITERIA

Effective Length Factors:

Twist restraint, k _t	1.10
Load height, k _l	1.40
Lateral rotation, k _r	1.00
Segment length, l	0.90
Effective length (l _e)	1.39

Deflection Limits:

Mid-span deflection:		Overhang deflection:	
L/δ _{Allowable}	300.00	L/δ _{Allowable}	300.00
δ _{MAX}	7.00	δ _{MAX}	7.00
δ _{LIMIT} (mm)	7.00	δ _{LIMIT} (mm)	7.00

Bearing and Shear Input:

Bearing length, b _t (mm)	90.00
b _s (mm)	0.00
Splayed depth (mm)	0.00

Moments for Calculation of α_m:

M* _m (kNm)	-9.410
M* ₂ (kNm)	-7.057
M* ₃ (kNm)	-9.410
M* ₄ (kNm)	-7.057

or

α _{m,manual}	0.00
β _{m,manual}	-1.00

NO USER INPUT REQUIRED BELOW THIS ROW

SUMMARY

BENDING STRENGTH:

oM _{xx}	37.152 kNm	>	9.410 kNm	O.K.
oM _{yy}	36.307 kNm	>	9.410 kNm	O.K.

WEB SHEAR STRENGTH:

oV _{xx}	135.821 kN	>	8.961 kN	O.K.
oV _{yy}	135.821 kN	>	8.961 kN	O.K.

WEB BEARING STRENGTH:

oR _{by}	245.700 kN	>	8.961 kN	O.K.
oR _{bb}	227.610 kN	>	8.961 kN	O.K.

SERVICEABILITY:

Span 1 δ _{MAX}	3.628 mm	<	7.000 mm	O.K.
Span 2 δ _{MAX}				
Span 3 δ _{MAX}				

OK FOR clarity loads

0.0

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ADOPTED 300

Permit No.: 20150189/0
Issue Date: 25/02/2015

Ari Akritidis
BS-U 1573

INSPECTION BOOKINGS: 95682992

STRUTTERE
consulting engineers

1 Erindale Road
Balcatta W.A. 6021
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email: info@struttere.com.au
JOB ADDRESS:

GENERAL STEEL BEAM DESIGN
TO AS4100-1998

Issued: XX/XX/2010

PROJECT No :
SHEET No :
BY : BRN DATE :

CLIENT:

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GENERAL STEEL BEAM DESIGN TO AS4100

USER INPUT

Member Configuration: N° of spans: 1 span

Span lengths (m):
Span 1: 3.200

DESIGN LOADS AND MEMBER ACTIONS

DISTRIBUTED LOADS

				Load widths/heights (m)					
Dead Loads:		Load:		Span 1	Span 2	Span 3	w ₁ (kN/m)	w ₂ (kN/m)	w ₃ (kN/m)
Timber Floor	⇅	0.800	kPa	*	0.000		0.000		
Roof Tiled	⇅	0.900	kPa	*	0.000		0.000		
172 (2c) Conc	⇅	4.128	kPa	*	0.000		0.000		
Roof Steel	⇅	0.400	kPa	*	0.000		0.000		
Additional Load		0.20	kPa	*	2.200		0.440		
Self weight of member		8.31	kg/m		1.000		0.082		
							0.522		

				Load widths/heights (m)					
Live Loads:		Load:		Span 1	Span 2	Span 3	w ₁ (kN/m)	w ₂ (kN/m)	w ₃ (kN/m)
Roof	⇅	0.250	kPa	*	0.000		0.000		
Floor (homes)	⇅	1.500	kPa	*	0.000		0.000		
Balcony (homes)	⇅	2.000	kPa	*	0.000		0.000		
Additional Load		-1.11	kPa	*	2.200		-2.442		
							-2.442		

POINT LOADS

		Concentrated Dead Load from RB5					Live Loads:		
Dead Loads:		Span 1	Span 2	Span 3			Span 1	Span 2	Span 3
P ₁ (kN)		0.000					P ₁ (kN)	0.000	
P ₂ (kN)		0.000					P ₂ (kN)	0.000	
P ₃ (kN)		0.000					P ₃ (kN)	0.000	

DESIGN LOAD CASES

				Distributed Loads:			
Design Load Cases:				Load Cases	w ₁ * (kN/m)	w ₂ * (kN/m)	w ₃ * (kN/m)
Ultimate (ULS)		0.9G; Wind	⇅	ULS	-1.973		
Serviceability (SLS)		Wup sls	⇅	SLS	-1.648		

		Span 1		Span 2		Span 3	
Point Loads:		a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
ULS:							
P ₁ (kN)	0.000	0.000	3.200				
P ₂ (kN)	0.000	0.000	3.200				
P ₃ (kN)	0.000	0.000	3.200				

		Span 1		Span 2		Span 3	
SLS:		a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
P ₁ (kN)	0.000	0.000	3.200				
P ₂ (kN)	0.000	0.000	3.200				
P ₃ (kN)	0.000	0.000	3.200				

MATERIAL & SECTION PROPERTIES AND ANALYSIS RESULTS

Section: 100 PFC

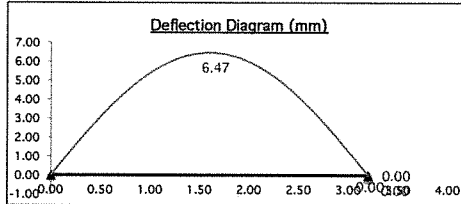
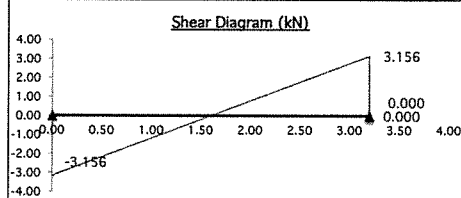
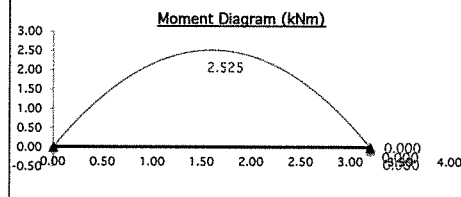
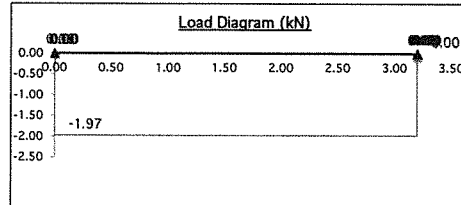
Designation	100 PFC
Mass per m (kg/m)	8.31
d (mm)	100.00
b _f (mm)	50.00
t _f (mm)	6.70
t _w (mm)	4.20
r _f (mm)	8.00
r _{ext} (mm)	-
d ₁ (mm)	86.60
d ₁ /t _w	20.60
(b _f t _w)/2t _f	6.84
A _g (mm ²)	1,060
J (mm ⁴)	13,200
I _y (mm ⁴)	4.24E+08
Form factor (k _f)	1
Flange f _y (MPa)	320
Web f _y (MPa)	320
E (MPa)	200,000
G (MPa)	80,000

About x-axis:

I _x (mm ⁴)	1.74E+06
Z _x (mm ³)	34,700
S _x (mm ³)	40,300
r _x (mm)	40.4
Compactness	-
Z _{xx} (mm ³)	40,300

About y-axis:

I _y (mm ⁴)	2.67E+05
Z _y (mm ³)	8,010
S _y (mm ³)	14,400
r _y (mm)	15.9
Compactness	-
Z _{yy} (mm ³)	12,000



Design Moments:	
Load case:	0.9G; Wind
Design Span:	Span 1
M* ₂	1.894 kNm
M* ₃	2.525 kNm
M* ₄	1.894 kNm
M* _m	2.525 kNm

Design Shear Forces & Reactions:	
Design Span:	Span 1
V* _{left}	-3.156 kN
V* _{right}	3.156 kN
V* _{max}	3.156 kN
R ₁	-3.156 kN
R ₂	-3.156 kN
R ₃	0.000 kN
R ₄	0.000 kN

Maximum Deflections:	
Load case:	#REF!
Span 1	6.47 mm
Span 2	0.00 mm
Span 3	0.00 mm

DESIGN CRITERIA

Effective Length Factors:

Twist restraint, k _t	1.10
Load height, k _l	1.40
Lateral rotation, k _r	1.00
Segment length, l	3.20
Effective length (l _e)	4.93

Deflection Limits:

Mid-span deflection:		Overhang deflection:	
L/δ _{Allowable}	150.00	L/δ _{Allowable}	150.00
δ _{MAX}	20.00	δ _{MAX}	20.00
δ _{LIMIT} (mm)	20.00	δ _{LIMIT} (mm)	20.00

Bearing and Shear Input:

Bearing length, b _t (mm)	90.00
b _f (mm)	0.00
Splayed depth (mm)	0.00

Moments for Calculation of α_{wp}:

M* _m (kNm)	2.525
M* ₂ (kNm)	1.894
M* ₃ (kNm)	2.525
M* ₄ (kNm)	1.894

or

α _{m,manual}	0.00
β _{m,manual}	-1.00

NO USER INPUT REQUIRED BELOW THIS ROW

SUMMARY

BENDING STRENGTH:

oM _{xx}	11.606 kNm	>	2.525 kNm	O.K.
oM _{yy}	4.188 kNm	>	2.525 kNm	O.K.

WEB SHEAR STRENGTH:

oV _x	62.851 kN	>	3.156 kN	O.K.
oV _y	62.851 kN	>	3.156 kN	O.K.

WEB BEARING STRENGTH:

oR _{by}	161.406 kN	>	6.280 kN	O.K.
oR _{bb}	137.378 kN	>	0.000 kN	O.K.

SERVICEABILITY:

Span 1 δ _{MAX}	6.467 mm	<	20.000 mm	O.K.
Span 2 δ _{MAX}				
Span 3 δ _{MAX}				

uplift load case
OK check

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Permit No.: 20150189/0
Issue Date: 25/02/2015

Ari Akritidis
BS-U 1573

INSPECTION BOOKINGS: 95682992

 1 Erindale Road Balcatta W.A. 6021 ph: (08) 9205 4500 fax: (08) 9205 4501 email: info@struttere.com.au JOB ADDRESS:	GENERAL STEEL BEAM DESIGN TO AS4100-1998 Issued: XX/XX/2010
CLIENT: _____ PROJECT No: _____ SHEET No: _____ BY: BRN DATE: _____	
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GENERAL STEEL BEAM DESIGN TO AS4100	
USER INPUT	

Member Configuration: N° of spans: 1 span	Span lengths (m): <table border="1" style="width: 100%;"> <tr> <td style="width: 33%;">Span 1</td> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> </tr> <tr> <td>3.200</td> <td> </td> <td> </td> </tr> </table>	Span 1			3.200		
Span 1							
3.200							

DESIGN LOADS AND MEMBER ACTIONS
DISTRIBUTED LOADS

		Load:		Load widths/heights (m)			w_1 (kN/m)	w_2 (kN/m)	w_3 (kN/m)
				Span 1	Span 2	Span 3			
Dead Loads:									
Timber Floor	↕	0.800 kPa	*	0.000			0.000		
Roof Tiled	↕	0.900 kPa	*	0.000			0.000		
172 (2c) Conc	↕	4.128 kPa	*	0.000			0.000		
Roof Steel	↕	0.400 kPa	*	0.000			0.000		
Additional Load		0.20 kPa	*	2.200			0.440		
Self weight of member		8.31 kg/m		1.000			0.082		
							0.522		

		Load:		Load widths/heights (m)			w_1 (kN/m)	w_2 (kN/m)	w_3 (kN/m)
				Span 1	Span 2	Span 3			
Live Loads:									
Roof	↕	0.250 kPa	*	2.200			0.550		
Floor (homes)	↕	1.500 kPa	*	0.000			0.000		
Balcony (homes)	↕	2.000 kPa	*	0.000			0.000		
Additional Load		-1.11 kPa	*	0.000			0.000		
							0.550		

POINT LOADS

		Concentrated Dead Load from RBS			Live Loads:		
		Span 1	Span 2	Span 3	Span 1	Span 2	Span 3
Dead Loads:							
P_1 (kN)		0.000			P_1 (kN)	0.000	
P_2 (kN)		0.000			P_2 (kN)	0.000	
P_3 (kN)		0.000			P_3 (kN)	0.000	

DESIGN LOAD CASES

Design Load Cases:		Distributed Loads:			
Ultimate (ULS)	1.2G + 1.5Q	Load Cases	w_1^* (kN/m)	w_2^* (kN/m)	w_3^* (kN/m)
Serviceability (SLS)	G	ULS	1.451		
		SLS	0.522		

	Span 1			Span 2		Span 3	
	a (m)	b (m)		a (m)	b (m)	a (m)	b (m)
Point Loads:							
ULS:							
P_1 (kN)	0.000	0.000	3.200				
P_2 (kN)	0.000	0.000	3.200				
P_3 (kN)	0.000	0.000	3.200				

	Span 1			Span 2	
	a (m)	b (m)		a (m)	b (m)
SLS:					
P_1 (kN)	0.000	0.000	3.200		
P_2 (kN)	0.000	0.000	3.200		
P_3 (kN)	0.000	0.000	3.200		

MATERIAL & SECTION PROPERTIES AND ANALYSIS RESULTS

Akritidis Group Building
Consultants
"Approved Plans and
Documentation"



**Permit No.: 20150189/0
Issue Date: 25/02/2015**


**Ari Akritidis
BS-U 1573**

INSPECTION BOOKINGS: 95682992

Section: 100 PFC

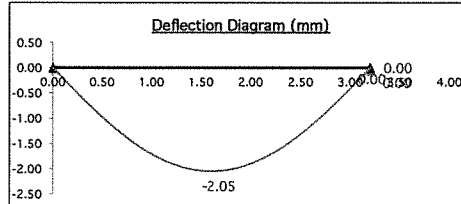
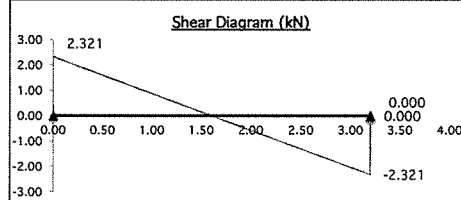
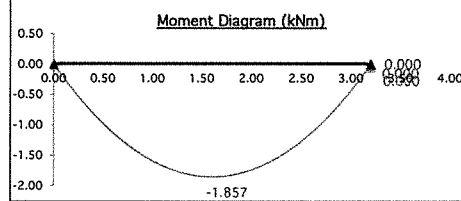
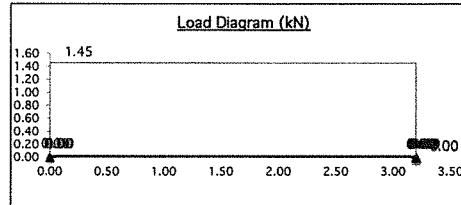
Designation	100 PFC
Mass per m (kg/m)	8.31
d (mm)	100.00
b _f (mm)	50.00
t _f (mm)	6.70
t _w (mm)	4.20
r ₁ (mm)	8.00
r _{ext} (mm)	-
d ₁ (mm)	86.60
d ₁ /t _w	20.60
(b _f -t _w)/2t _f	6.84
A _g (mm ²)	1,060
J (mm ⁴)	13,200
I _w (mm ⁴)	4.24E+08
Form factor (k _t)	1
Flange f _y (MPa)	320
Web f _y (MPa)	320
E (MPa)	200,000
G (MPa)	80,000

About x-axis:

I _x (mm ⁴)	1.74E+06
Z _x (mm ³)	34,700
S _x (mm ³)	40,300
r _x (mm)	40.4
Compactness	-
Z _{xx} (mm ³)	40,300

About y-axis:

I _y (mm ⁴)	2.67E+05
Z _y (mm ³)	8,010
S _y (mm ³)	14,400
r _y (mm)	15.9
Compactness	-
Z _{yy} (mm ³)	12,000



Design Moments:	
Load case:	1.2G + 1.5Q
Design Span:	Span 1
M* ₂	-1.393 kNm
M* ₃	-1.857 kNm
M* ₄	-1.393 kNm
M* _m	-1.857 kNm

Design Shear Forces & Reactions:	
Design Span:	Span 1
V* _{left}	2.321 kN
V* _{right}	-2.321 kN
V* _{max}	2.321 kN
R ₁	2.321 kN
R ₂	2.321 kN
R ₃	0.000 kN
R ₄	0.000 kN

Maximum Deflections:	
Load case:	G
Span 1	-2.05 mm
Span 2	0.00 mm
Span 3	0.00 mm

DESIGN CRITERIA

Effective Length Factors:

Twist restraint, k _t	1.10
Load height, k _l	1.40
Lateral rotation, k _r	1.00
Segment length, l	0.90
Effective length (l _e)	1.39

Deflection Limits:

Mid-span deflection:		Overhang deflection:	
L/δ _{allowable}	300.00	L/δ _{allowable}	300.00
δ _{max}	7.00	δ _{max}	7.00
δ _{limit} (mm)	7.00	δ _{limit} (mm)	7.00

Bearing and Shear Input:

Bearing length, b _t (mm)	90.00
b _d (mm)	0.00
Splayed depth (mm)	0.00

Moments for Calculation of α_m:

M* _m (kNm)	-1.857
M* ₂ (kNm)	-1.393
M* ₃ (kNm)	-1.857
M* ₄ (kNm)	-1.393

or

α _{m, manual}	0.00
β _{m, manual}	-1.00

NO USER INPUT REQUIRED BELOW THIS ROW

SUMMARY

BENDING STRENGTH:

oM _{xx}	11.606 kNm	>	1.857 kNm	O.K.
oM _{yy}	9.812 kNm	>	1.857 kNm	O.K.

WEB SHEAR STRENGTH:

oV _u	62.851 kN	>	2.321 kN	O.K.
oV _m	62.851 kN	>	2.321 kN	O.K.

WEB BEARING STRENGTH:

oR _{by}	161.406 kN	>	8.790 kN	O.K.
oR _{bb}	137.378 kN	>	2.321 kN	O.K.

SERVICEABILITY:

Span 1 δ _{MAX}	2.046 mm	<	7.000 mm	O.K.
Span 2 δ _{MAX}				
Span 3 δ _{MAX}				

GRAVITY LOAD CASE
IS OKAkrutidis Group Building
Consultants"Approved Plans and
Documentation"Permit No.: 20150189/0
Issue Date: 25/02/2015Ari Akrutidis
BS-U 1573

INSPECTION BOOKINGS: 95682992

RB3.

SB 20-1-15.

 1 Erindale Road Balcatta W.A. 6021 ph: (08) 9205 4500 fax: (08) 9205 4501 email: info@structerre.com.au JOB ADDRESS:	GENERAL STEEL BEAM DESIGN TO AS4100-1998 Issued: XX/XX/2010
CLIENT: PROJECT No : SHEET No : BY : BRN DATE :	
THIS SPREADSHEET IS THE INTELLECTUAL PROPERTY OF STRUTTERE CONSULTING ENGINEERS AND IS PROTECTED BY COPYRIGHT. IT IS UNLAWFUL FOR IT TO BE USED OR COPIED BY OTHER THAN CURRENT EMPLOYEES OR AUTHORISED SUBCONTRACTORS OF STRUTTERE. THIS SPREADSHEET HAS NOT YET BEEN VERIFIED AND SANCTIONED FOR USE BY THE SPREADSHEET COMMITTEE. THE USER IS THEREFORE RESPONSIBLE FOR ITS VERACITY IT IS ASSUMED THAT YOU, THE USER, ARE SUITABLY FAMILIAR WITH THE MATERIAL, STRUCTURAL DESIGN ISSUES AND PRINCIPLES ASSOCIATED WITH CALCULATIONS THAT THIS SPREADSHEET CARRIES OUT. IF YOU DO NOT FULLY UNDERSTAND THE UNDERLYING PRINCIPLES OR HOW TO USE IT PROPERLY, YOU MUST SEEK ADVICE FROM SOMEONE WHO DOES BEFORE ATTEMPTING TO USE THIS TOOL.	
GENERAL STEEL BEAM DESIGN TO AS4100	
USER INPUT	

Member Configuration: N° of spans: 1 span	Span lengths (m): <table border="1" style="width: 100%;"> <tr> <td style="width: 33%;">Span 1</td> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> </tr> <tr> <td>7.200</td> <td> </td> <td> </td> </tr> </table>	Span 1			7.200		
Span 1							
7.200							

DESIGN LOADS AND MEMBER ACTIONS

DISTRIBUTED LOADS

Dead Loads:		Load:		Load widths/heights (m)			w_1 (kN/m)	w_2 (kN/m)	w_3 (kN/m)
				Span 1	Span 2	Span 3			
Timber Floor	↑	0.800	kPa	*	0.000		0.000		
Roof Tiled	↑	0.900	kPa	*	0.000		0.000		
172 (2c) Conc	↑	4.128	kPa	*	0.000		0.000		
Roof Steel	↑	0.400	kPa	*	0.000		0.000		
Additional Load	↑	0.20	kPa	*	1.500		0.300		
Self weight of member		20.90	kg/m		1.000		0.205		
							0.505		

Live Loads:		Load:		Load widths/heights (m)			w_1 (kN/m)	w_2 (kN/m)	w_3 (kN/m)
				Span 1	Span 2	Span 3			
Roof	↑	0.250	kPa	*	0.000		0.000		
Floor (homes)	↑	1.500	kPa	*	0.000		0.000		
Balcony (homes)	↑	2.000	kPa	*	0.000		0.000		
Additional Load	↑	-1.11	kPa	*	1.500		-1.665		
							-1.665		

POINT LOADS

Dead Loads:		Concentrated Dead Load from RB5			Live Loads:				
		Span 1	Span 2	Span 3		Span 1	Span 2	Span 3	
P_1 (kN)		0.000			P_1 (kN)	0.000			
P_2 (kN)		0.000			P_2 (kN)	0.000			
P_3 (kN)		0.000			P_3 (kN)	0.000			

DESIGN LOAD CASES

Design Load Cases:		Distributed Loads:			
Ultimate (ULS)	0.9G; Wind	Load Cases	w_1^* (kN/m)	w_2^* (kN/m)	w_3^* (kN/m)
Serviceability (SLS)	Wup sls	ULS	-1.210		
		SLS	-1.124		

Point Loads:		Span 1		Span 2		Span 3	
		a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
ULS:							
P_1 (kN)	0.000	0.000	7.200				
P_2 (kN)	0.000	0.000	7.200				
P_3 (kN)	0.000	0.000	7.200				

SLS:		Span 1		Span 2		Span 3	
		a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
P_1 (kN)	0.000	0.000	7.200				
P_2 (kN)	0.000	0.000	7.200				
P_3 (kN)	0.000	0.000	7.200				

MATERIAL & SECTION PROPERTIES AND ANALYSIS RESULTS



Ari Akritidis
BS-U 1573

INSPECTION BOOKINGS: 95682992

Akritidis Group Building
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Permit No.: 20150189/0
Issue Date: 25/02/2015

Section: 180 PFC

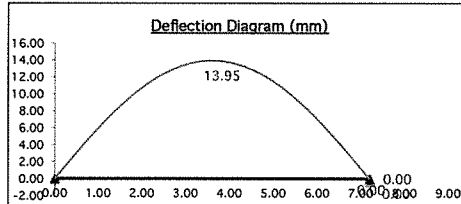
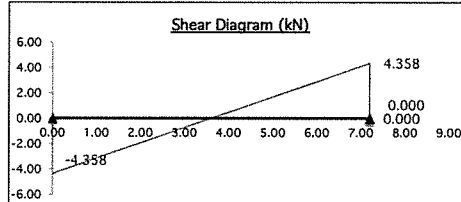
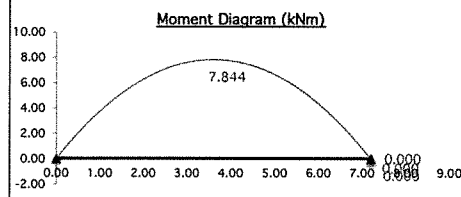
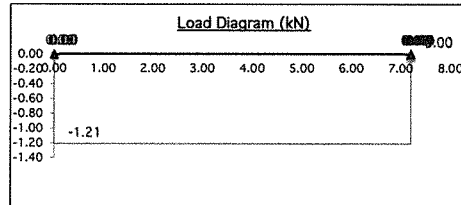
Designation	180 PFC
Mass per m (kg/m)	20.90
d (mm)	180.00
b _f (mm)	75.00
t _f (mm)	11.00
t _w (mm)	6.00
r _f (mm)	12.00
r _{ext} (mm)	-
d ₁ (mm)	158.00
d ₁ /t _w	26.30
(b _f -t _w)/2t _f	6.27
A _g (mm ²)	2,660
J (mm ⁴)	81,400
I _y (mm ⁴)	7.82E+09
Form factor (k _f)	1
Flange f _y (MPa)	300
Web f _y (MPa)	320
E (MPa)	200,000
G (MPa)	80,000

About x-axis:

I _x (mm ⁴)	1.41E+07
Z _x (mm ³)	157,000
S _x (mm ³)	182,000
r _x (mm)	72.9
Compactness	-
Z _{xx} (mm ³)	182,000

About y-axis:

I _y (mm ⁴)	1.51E+06
Z _y (mm ³)	29,900
S _y (mm ³)	53,800
r _y (mm)	23.8
Compactness	-
Z _{yy} (mm ³)	44,800



Design Moments:		
Load case:	0.9G; Wind	
Design Span:	Span 1	
M ₂	5.883	kNm
M ₃	7.844	kNm
M ₄	5.883	kNm
M _m	7.844	kNm

Design Shear Forces & Reactions:		
Design Span:	Span 1	
V _{left}	-4.358	kN
V _{right}	4.358	kN
V _{max}	4.358	kN
R ₁	-4.358	kN
R ₂	-4.358	kN
R ₃	0.000	kN
R ₄	0.000	kN

Maximum Deflections:		
Load case:	#REF!	
Span 1	13.95	mm
Span 2	0.00	mm
Span 3	0.00	mm

DESIGN CRITERIA

Effective Length Factors:

Twist restraint, k _t	1.10
Load height, k _l	1.40
Lateral rotation, k _r	1.00
Segment length, l	0.90
Effective length (L _e)	1.39

Deflection Limits:

Mid-span deflection:		Overhang deflection:	
L/δ _{Allowable}	150.00	L/δ _{Allowable}	150.00
δ _{MAX}	20.00	δ _{MAX}	20.00
δ _{LIMIT} (mm)	20.00	δ _{LIMIT} (mm)	20.00

Bearing and Shear Input:

Bearing length, b _r (mm)	90.00
b _f (mm)	0.00
Splayed depth (mm)	0.00

Moments for Calculation of α_m:

M _m (kNm)	7.844
M ₂ (kNm)	5.883
M ₃ (kNm)	7.844
M ₄ (kNm)	5.883

or

α _{m, manual}	0.00
β _{m, manual}	-1.00

NO USER INPUT REQUIRED BELOW THIS ROW

SUMMARY

BENDING STRENGTH:

oM _{xx}	49.140	kNm	>	7.844	kNm	O.K.
oM _{yy}	48.356	kNm	>	7.844	kNm	O.K.

WEB SHEAR STRENGTH:

oV _u	163.814	kN	>	4.358	kN	O.K.
oV _m	163.814	kN	>	4.358	kN	O.K.

WEB BEARING STRENGTH:

oR _{by}	253.800	kN	>	6.280	kN	O.K.
oR _{bb}	220.609	kN	>	0.000	kN	O.K.

SERVICEABILITY:

Span 1 δ _{MAX}	13.946	mm	<	20.000	mm	O.K.
Span 2 δ _{MAX}						
Span 3 δ _{MAX}						

Uplift load case is
OK check

Akritidis Group Building
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"Approved Plans and
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Permit No.: 20150189/0
Issue Date: 25/02/2015

Ari Akritidis
BS-U 1573

INSPECTION BOOKINGS: 95682992

 1 Erindale Road Balcatta W.A. 6021 ph: (08) 9205 4500 fax: (08) 9205 4501 email: info@structerre.com.au JOB ADDRESS:	GENERAL STEEL BEAM DESIGN TO AS4100-1998 Issued: XX/XX/2010
RB3	
CLIENT: PROJECT No: _____ BY: BRN DATE: _____ THIS SPREADSHEET IS THE INTELLECTUAL PROPERTY OF STRUCTERRE CONSULTING ENGINEERS AND IS PROTECTED BY COPYRIGHT. IT IS UNLAWFUL FOR IT TO BE USED OR COPIED BY OTHER THAN CURRENT EMPLOYEES OR AUTHORISED SUBCONTRACTORS OF STRUCTERRE. THIS SPREADSHEET HAS NOT YET BEEN VERIFIED AND SANCTIONED FOR USE BY THE SPREADSHEET COMMITTEE. THE USER IS THEREFORE RESPONSIBLE FOR ITS VERACITY IT IS ASSUMED THAT YOU, THE USER, ARE SUITABLY FAMILIAR WITH THE MATERIAL, STRUCTURAL DESIGN ISSUES AND PRINCIPLES ASSOCIATED WITH CALCULATIONS THAT THIS SPREADSHEET CARRIES OUT. IF YOU DO NOT FULLY UNDERSTAND THE UNDERLYING PRINCIPLES OR HOW TO USE IT PROPERLY, YOU MUST SEEK ADVICE FROM SOMEONE WHO DOES BEFORE ATTEMPTING TO USE THIS TOOL.	
GENERAL STEEL BEAM DESIGN TO AS4100	
USER INPUT	

Member Configuration: N° of spans: 1 span	Span lengths (m): <table border="1" style="width: 100%;"> <tr> <td style="width: 33%;">Span 1</td> <td style="width: 33%;"> </td> <td style="width: 33%;"> </td> </tr> <tr> <td style="background-color: #d3d3d3;">7.200</td> <td> </td> <td> </td> </tr> </table>	Span 1			7.200		
Span 1							
7.200							

DESIGN LOADS AND MEMBER ACTIONS
DISTRIBUTED LOADS

Dead Loads:		Load:		Load widths/heights (m)			w_1 (kN/m)	w_2 (kN/m)	w_3 (kN/m)
				Span 1	Span 2	Span 3			
Timber Floor	↕	0.800	kPa	*	0.000		0.000		
Roof Tiled	↕	0.900	kPa	*	0.000		0.000		
172 (2c) Conc	↕	4.128	kPa	*	0.000		0.000		
Roof Steel	↕	0.400	kPa	*	0.000		0.000		
Additional Load	↕	0.20	kPa	*	1.500		0.300		
Self weight of member		20.90	kg/m		1.000		0.205		
							0.505		

Live Loads:		Load:		Load widths/heights (m)			w_1 (kN/m)	w_2 (kN/m)	w_3 (kN/m)
				Span 1	Span 2	Span 3			
Roof	↕	0.250	kPa	*	1.500		0.375		
Floor (homes)	↕	1.500	kPa	*	0.000		0.000		
Balcony (homes)	↕	2.000	kPa	*	0.000		0.000		
Additional Load	↕	-1.11	kPa	*	0.000		0.000		
							0.375		

POINT LOADS

Dead Loads:		Concentrated Dead Load from RB5			Live Loads:				
		Span 1	Span 2	Span 3			Span 1	Span 2	Span 3
P_1 (kN)	↕	0.000			P_1 (kN)	↕	0.000		
P_2 (kN)	↕	0.000			P_2 (kN)	↕	0.000		
P_3 (kN)	↕	0.000			P_3 (kN)	↕	0.000		

DESIGN LOAD CASES

Design Load Cases:		Distributed Loads:			
Ultimate (ULS)	1.2G + 1.5Q	Load Cases	w_1^* (kN/m)	w_2^* (kN/m)	w_3^* (kN/m)
Serviceability (SLS)	G	ULS	1.169		
		SLS	0.505		

Point Loads:	ULS:	Span 1		Span 2		Span 3	
		a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
P_1 (kN)	0.000	0.000	7.200				
P_2 (kN)	0.000	0.000	7.200				
P_3 (kN)	0.000	0.000	7.200				

SLS:	Span 1		Span 2		Span 3	
	a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
P_1 (kN)	0.000	7.200				
P_2 (kN)	0.000	7.200				
P_3 (kN)	0.000	7.200				

MATERIAL & SECTION PROPERTIES AND ANALYSIS RESULTS
--

Section: 180 PFC

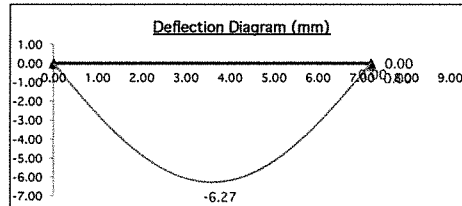
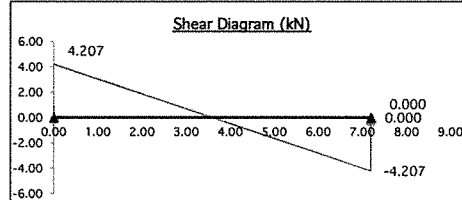
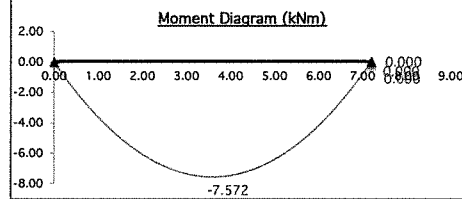
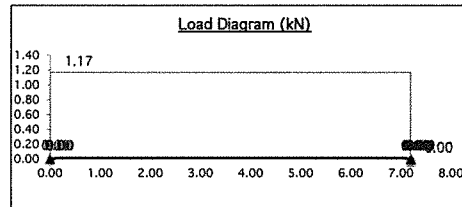
Designation	180 PFC
Mass per m (kg/m)	20.90
d (mm)	180.00
b _f (mm)	75.00
t _f (mm)	11.00
t _w (mm)	6.00
r ₁ (mm)	12.00
r _{ext} (mm)	-
d ₁ (mm)	158.00
d ₁ /t _w	26.30
(b _f -t _w)/2t _f	6.27
A _g (mm ²)	2,660
J (mm ⁴)	81,400
I _w (mm ⁶)	7.82E+09
Form factor (k _f)	1
Flange f _y (MPa)	300
Web f _y (MPa)	320
E (MPa)	200,000
G (MPa)	80,000

About x-axis:

I _x (mm ⁴)	1.41E+07
Z _x (mm ³)	157,000
S _x (mm ³)	182,000
r _x (mm)	72.9
Compactness	-
Z _{xx} (mm ³)	182,000

About y-axis:

I _y (mm ⁴)	1.51E+06
Z _y (mm ³)	29,900
S _y (mm ³)	53,800
r _y (mm)	23.8
Compactness	-
Z _{yy} (mm ³)	44,800



Design Moments:	
Load case:	1.2G + 1.5Q
Design Span:	Span 1
M ₂	-5.679 kNm
M ₃	-7.572 kNm
M ₄	-5.679 kNm
M _m	-7.572 kNm

Design Shear Forces & Reactions:	
Design Span:	Span 1
V _{left}	4.207 kN
V _{right}	-4.207 kN
V _{max}	4.207 kN
R ₁	4.207 kN
R ₂	4.207 kN
R ₃	0.000 kN
R ₄	0.000 kN

Maximum Deflections:	
Load case:	G
Span 1	-6.27 mm
Span 2	0.00 mm
Span 3	0.00 mm

DESIGN CRITERIA

Effective Length Factors:

Twist restraint, k _t	1.10
Load height, k _l	1.40
Lateral rotation, k _r	1.00
Segment length, l	0.90
Effective length (l _e)	1.39

Deflection Limits:

Mid-span deflection:		Overhang deflection:	
L/δ _{allowable}	300.00	L/δ _{allowable}	300.00
δ _{max}	7.00	δ _{max}	7.00
δ _{limit} (mm)	7.00	δ _{limit} (mm)	7.00

Bearing and Shear Input:

Bearing length, b _t (mm)	90.00
b _s (mm)	0.00
Splayed depth (mm)	0.00

Moments for Calculation of α_{mt}:

M _m (kNm)	-7.572
M ₂ (kNm)	-5.679
M ₃ (kNm)	-7.572
M ₄ (kNm)	-5.679

or

α _{mt, manual}	0.00
β _{mt, manual}	-1.00

NO USER INPUT REQUIRED BELOW THIS ROW

SUMMARY

BENDING STRENGTH:

oM _{xx}	49.140 kNm	>	7.572 kNm	O.K.
oM _{yy}	48.356 kNm	>	7.572 kNm	O.K.

WEB SHEAR STRENGTH:

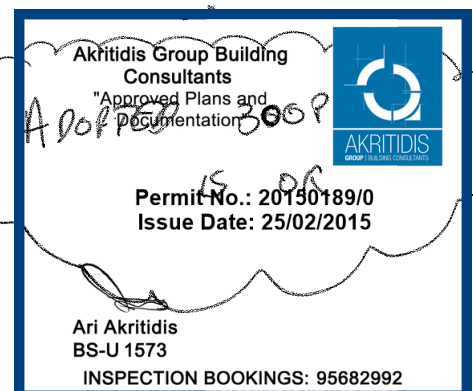
oV _u	163.814 kN	>	4.207 kN	O.K.
oV _{rm}	163.814 kN	>	4.207 kN	O.K.

WEB BEARING STRENGTH:

oR _{by}	253.800 kN	>	8.790 kN	O.K.
oR _{bb}	220.609 kN	>	4.207 kN	O.K.

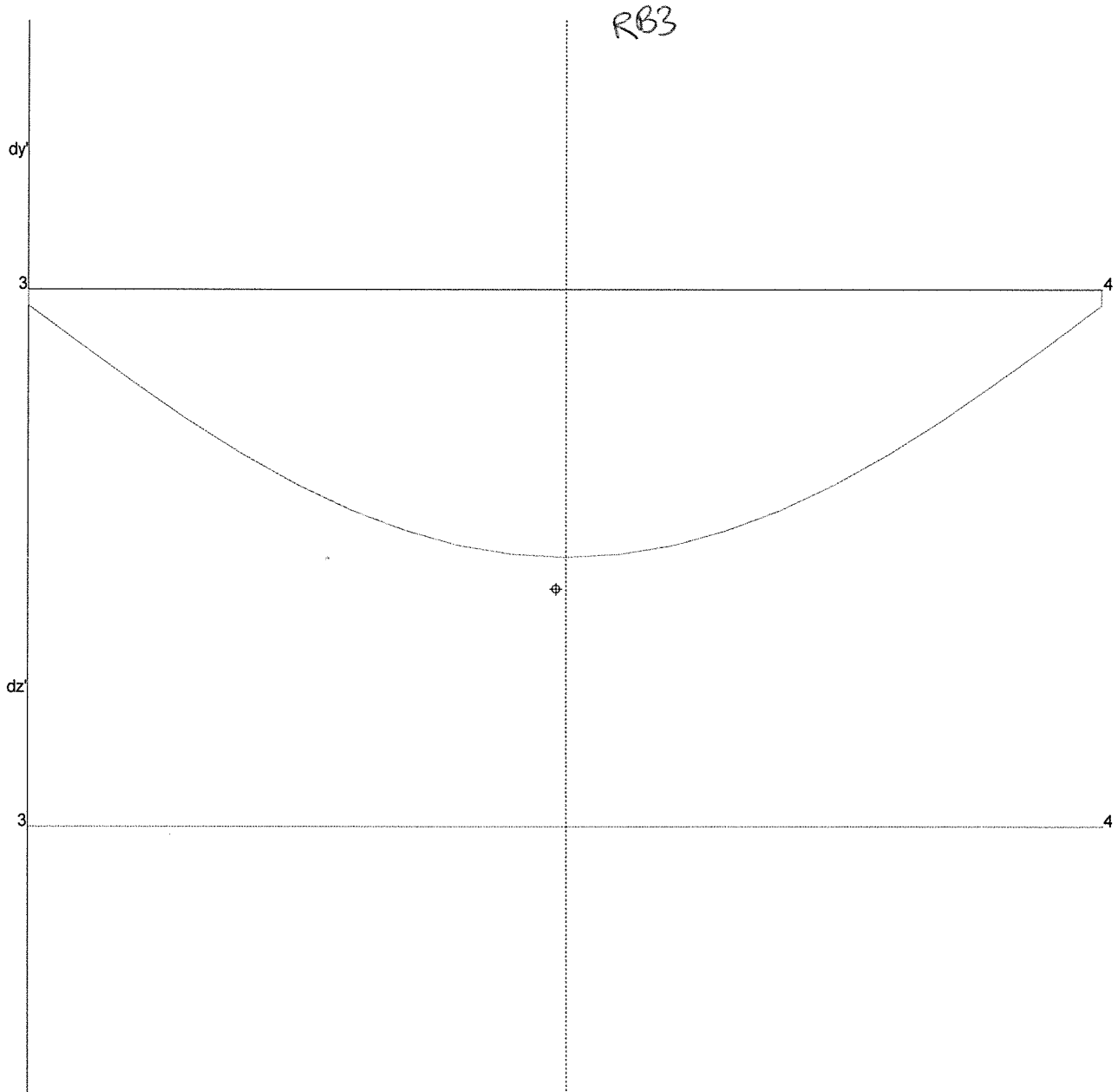
SERVICEABILITY:

Span 1 δ _{MAX}	6.267 mm	<	7.000 mm	O.K.
Span 2 δ _{MAX}				
Span 3 δ _{MAX}				

gravity load case
is OK



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dy' -6.622mm
dz' 0.000mm
Dist 3600.000mm

Plot View - Static Case: Gtotal

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Permit No.: 20150189/0
Issue Date: 25/02/2015

Max dy 6.622mm
Max dz' 0.000mm
Dist 3600.000mm

Ari Akritidis
BS-U 1573

INSPECTION BOOKINGS: 95682992

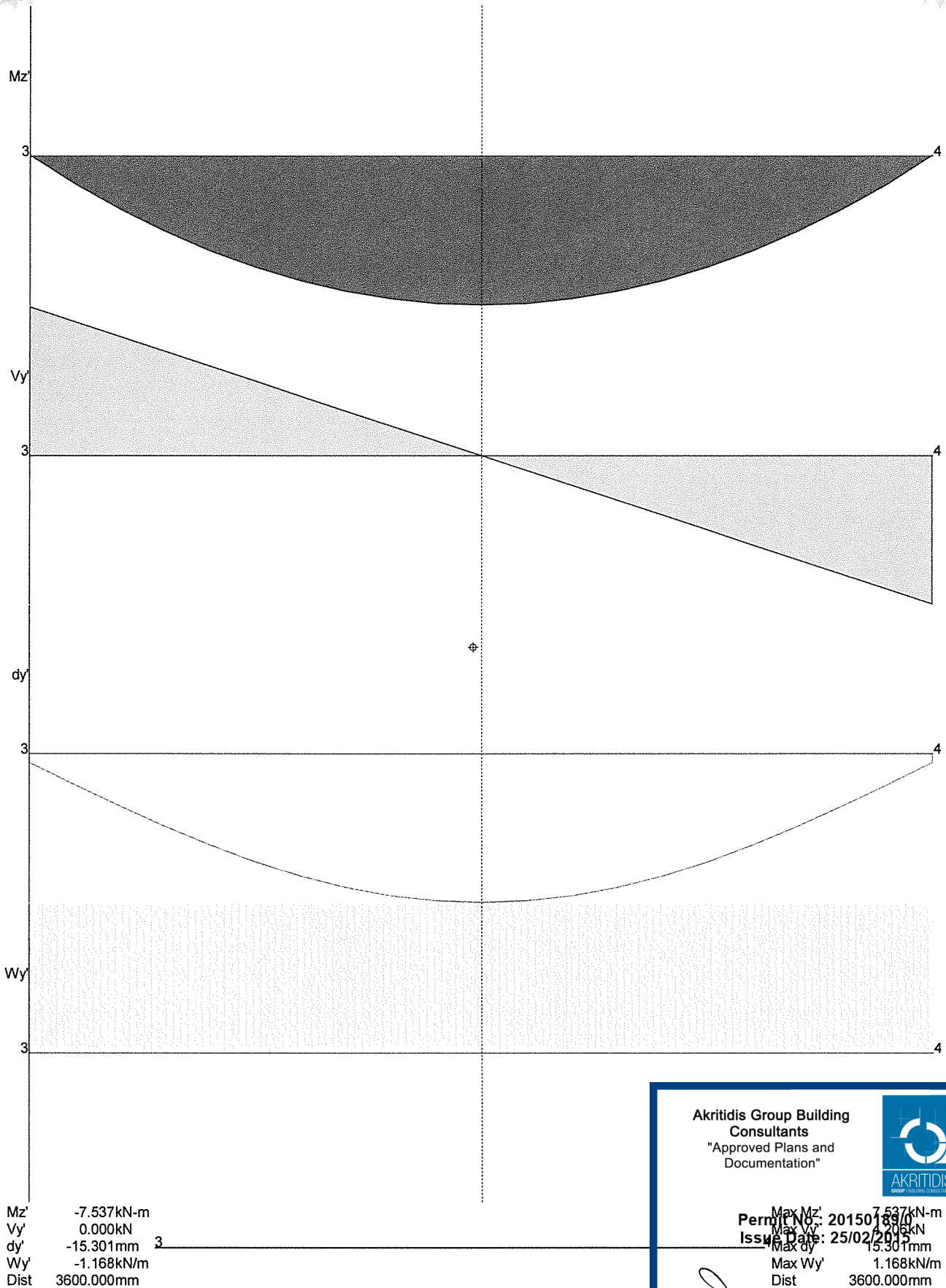


Page 22 RB3



January 13, 2015
MultiView4D Version 14.02

C:\Documents and Settings\bnas\Desktop\Melbourne Jobs\F14190\



Plot View - Static Case: 1.2G+1.5Q

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Max Mz' 7.537kN-m
Permit No. 201501890
Max Vy' 0.000kN
Issue Date: 25/02/2015
Max dy' 15.301mm
Max Wy' 1.168kN/m
Dist 3600.000mm

Ari Akritidis
BS-U 1573

INSPECTION BOOKINGS: 95682992

 1 Erindale Road Balcatta W.A. 6021 ph: (08) 9205 4500 fax: (08) 9205 4501 email: info@structerre.com.au JOB ADDRESS:	GENERAL STEEL BEAM DESIGN TO AS4100-1998 Issued: XX/XX/2010
RB4	
CLIENT:	PROJECT No : SHEET No : BY : BRN DATE :
THIS SPREADSHEET IS THE INTELLECTUAL PROPERTY OF STRUTTERE CONSULTING ENGINEERS AND IS PROTECTED BY COPYRIGHT. IT IS UNLAWFUL FOR IT TO BE USED OR COPIED BY OTHER THAN CURRENT EMPLOYEES OR AUTHORISED SUBCONTRACTORS OF STRUTTERE. THIS SPREADSHEET HAS NOT YET BEEN VERIFIED AND SANCTIONED FOR USE BY THE SPREADSHEET COMMITTEE. THE USER IS THEREFORE RESPONSIBLE FOR ITS VERACITY IT IS ASSUMED THAT YOU, THE USER, ARE SUITABLY FAMILIAR WITH THE MATERIAL, STRUCTURAL DESIGN ISSUES AND PRINCIPLES ASSOCIATED WITH CALCULATIONS THAT THIS SPREADSHEET CARRIES OUT. IF YOU DO NOT FULLY UNDERSTAND THE UNDERLYING PRINCIPLES OR HOW TO USE IT PROPERLY, YOU MUST SEEK ADVICE FROM SOMEONE WHO DOES BEFORE ATTEMPTING TO USE THIS TOOL.	
GENERAL STEEL BEAM DESIGN TO AS4100	
USER INPUT	

Member Configuration: N° of spans: 1 span	Span lengths (m): <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Span 1</td> <td style="width: 50%;"></td> </tr> <tr> <td style="background-color: #d3d3d3;">12.000</td> <td></td> </tr> </table>	Span 1		12.000	
Span 1					
12.000					

DESIGN LOADS AND MEMBER ACTIONS
DISTRIBUTED LOADS

		Load:		Load widths/heights (m)			w_1 (kN/m)	w_2 (kN/m)	w_3 (kN/m)
				Span 1	Span 2	Span 3			
Dead Loads:									
Timber Floor	↑	0.800	kPa	*	0.000		0.000		
Roof Tiled	↑	0.900	kPa	*	0.000		0.000		
172 (2c) Conc	↑	4.128	kPa	*	0.000		0.000		
Roof Steel	↑	0.400	kPa	*	0.000		0.000		
Additional Load		0.20	kPa	*	0.900		0.180		
Self weight of member		35.50	kg/m		1.000		0.348		
							0.528		

		Load:		Load widths/heights (m)			w_1 (kN/m)	w_2 (kN/m)	w_3 (kN/m)
				Span 1	Span 2	Span 3			
Live Loads:									
Roof	↑	0.250	kPa	*	0.000		0.000		
Floor (homes)	↑	1.500	kPa	*	0.000		0.000		
Balcony (homes)	↑	2.000	kPa	*	0.000		0.000		
Additional Load		-1.11	kPa	*	0.900		-0.999		
							-0.999		

POINT LOADS

		Concentrated Dead Load from RB5			Live Loads:		
		Span 1	Span 2	Span 3	Span 1	Span 2	Span 3
Dead Loads:							
P_1 (kN)		0.000			P_1 (kN)	0.000	
P_2 (kN)		0.000			P_2 (kN)	0.000	
P_3 (kN)		0.000			P_3 (kN)	0.000	

DESIGN LOAD CASES

Design Load Cases:	
Ultimate (ULS)	0.9G; Wind
Serviceability (SLS)	Wup sls

Distributed Loads:			
Load Cases	w_1^* (kN/m)	w_2^* (kN/m)	w_3^* (kN/m)
ULS	-0.524		
SLS	-0.674		

Point Loads:	Span 1			Span 2		Span 3	
		a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
ULS:							
P_1 (kN)	0.000	0.000	12.000				
P_2 (kN)	0.000	0.000	12.000				
P_3 (kN)	0.000	0.000	12.000				

SLS:	Span 1			Span 2		Span 3	
		a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
P_1 (kN)	0.000	0.000	12.000				
P_2 (kN)	0.000	0.000	12.000				
P_3 (kN)	0.000	0.000	12.000				

MATERIAL & SECTION PROPERTIES AND ANALYSIS RESULTS

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Section: 250 PFC

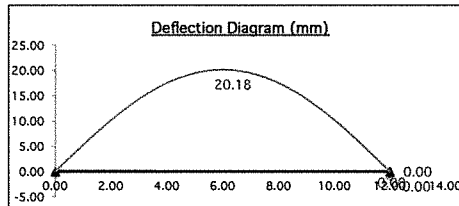
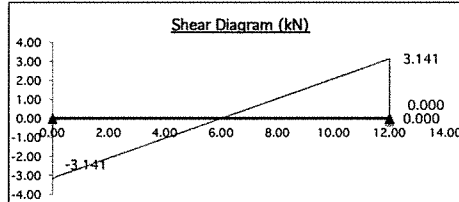
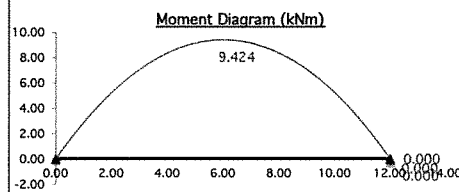
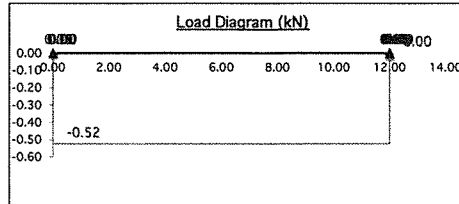
Designation	250 PFC
Mass per m (kg/m)	35.50
d (mm)	250.00
b _f (mm)	90.00
t _f (mm)	15.00
t _w (mm)	8.00
r ₁ (mm)	12.00
r _{ext} (mm)	-
d ₁ (mm)	220.00
d ₁ /t _w	27.50
(b _f -t _w)/2t _f	5.47
A _g (mm ²)	4,520
J (mm ⁴)	238,000
I _w (mm ⁶)	3.59E+10
Form factor (k _f)	1
Flange f _y (MPa)	300
Web f _y (MPa)	320
E (MPa)	200,000
G (MPa)	80,000

About x-axis:

I _x (mm ⁴)	4.51E+07
Z _x (mm ³)	361,000
S _x (mm ³)	421,000
r _x (mm)	99.9
Compactness	-
Z _{xx} (mm ³)	421,000

About y-axis:

I _y (mm ⁴)	3.64E+06
Z _y (mm ³)	59,300
S _y (mm ³)	107,000
r _y (mm)	28.4
Compactness	-
Z _{yy} (mm ³)	88,700



Design Moments:		
Load case:	0.9G; Wind	
Design Span:	Span 1	
M* ₂	7.068	kNm
M* ₃	9.424	kNm
M* ₄	7.068	kNm
M* _m	9.424	kNm

Design Shear Forces & Reactions:		
Design Span:	Span 1	
V* _{left}	-3.141	kN
V* _{right}	3.141	kN
V* _{max}	3.141	kN
R ₁	-3.141	kN
R ₂	-3.141	kN
R ₃	0.000	kN
R ₄	0.000	kN

Maximum Deflections:		
Load case:	#REF!	
Span 1	20.18	mm
Span 2	0.00	mm
Span 3	0.00	mm

DESIGN CRITERIA

Effective Length Factors:

Twist restraint, k _t	1.10
Load height, k _l	1.40
Lateral rotation, k _r	1.00
Segment length, l	0.90
Effective length (l _e)	1.39

Deflection Limits:

Mid-span deflection:		Overhang deflection:	
L/δ _{Allowable}	150.00	L/δ _{Allowable}	150.00
δ _{MAX}	20.00	δ _{MAX}	20.00
δ _{LIMIT} (mm)	20.00	δ _{LIMIT} (mm)	20.00

Bearing and Shear Input:

Bearing length, b _f (mm)	90.00
b _f (mm)	0.00
Splayed depth (mm)	0.00

Moments for Calculation of α_m:

M* _m (kNm)	9.424
M* ₂ (kNm)	7.068
M* ₃ (kNm)	9.424
M* ₄ (kNm)	7.068

or

α _{m, manual}	0.00
β _{m, manual}	-1.00

NO USER INPUT REQUIRED BELOW THIS ROW

SUMMARY

BENDING STRENGTH:

oM _{xx} = 113.670	kNm	>	9.424	kNm	O.K.
oM _{yy} = 113.670	kNm	>	9.424	kNm	O.K.

WEB SHEAR STRENGTH:

oV _u = 304.128	kN	>	3.141	kN	O.K.
oV _m = 304.128	kN	>	3.141	kN	O.K.

WEB BEARING STRENGTH:

oR _{by} = 367.200	kN	>	6.280	kN	O.K.
oR _{bb} = 343.276	kN	>	0.000	kN	O.K.

SERVICEABILITY:

Span 1 δ _{MAX} = 20.185	mm	>	20.000	mm	Warning!
Span 2 δ _{MAX} =					
Span 3 δ _{MAX} =					

Uplift load case
is OKcheck given
Akritidis Group Building
Consultants
"Approved Plans and
Documentation" OKPermit No.: 20150189/0
Issue Date: 25/02/2015Ari Akritidis
BS-U 1573

INSPECTION BOOKINGS: 95682992

STRUTTERRE
consulting engineers

1 Erindale Road
Balcatta W.A. 6021
ph: (08) 9205 4500 fax: (08) 9205 4501
email: info@strutterre.com.au
JOB ADDRESS:

PROJECT No :
SHEET No :
BY : BRN DATE :
Issued: XX/XX/2010

CLIENT:

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GENERAL STEEL BEAM DESIGN TO AS4100

USER INPUT

Member Configuration: N° of spans: 1 span

Span lengths (m):
Span 1: 12.000

DESIGN LOADS AND MEMBER ACTIONS

DISTRIBUTED LOADS

				Load widths/heights (m)					
Dead Loads:		Load:		Span 1	Span 2	Span 3	w ₁ (kN/m)	w ₂ (kN/m)	w ₃ (kN/m)
Timber Floor	↕	0.800	kPa	*	0.000		0.000		
Roof Tiled	↕	0.900	kPa	*	0.000		0.000		
172 (2c) Conc	↕	4.128	kPa	*	0.000		0.000		
Roof Steel	↕	0.400	kPa	*	0.000		0.000		
Additional Load		0.20	kPa	*	0.900		0.180		
Self weight of member		35.50	kg/m		1.000		0.348		
							0.528		

				Load widths/heights (m)					
Live Loads:		Load:		Span 1	Span 2	Span 3	w ₁ (kN/m)	w ₂ (kN/m)	w ₃ (kN/m)
Roof	↕	0.250	kPa	*	0.900		0.225		
Floor (homes)	↕	1.500	kPa	*	0.000		0.000		
Balcony (homes)	↕	2.000	kPa	*	0.000		0.000		
Additional Load		-1.11	kPa	*	0.000		0.000		
							0.225		

POINT LOADS

Dead Loads:		Span 1	Span 2	Span 3	Live Loads:		Span 1	Span 2	Span 3
P ₁ (kN)		0.000			P ₁ (kN)		0.000		
P ₂ (kN)		0.000			P ₂ (kN)		0.000		
P ₃ (kN)		0.000			P ₃ (kN)		0.000		

DESIGN LOAD CASES

Design Load Cases:		Distributed Loads:		
Ultimate (ULS)	1.2G + 1.5Q	Load Cases	w ₁ * (kN/m)	w ₂ * (kN/m)
Serviceability (SLS)	G	ULS	0.971	
		SLS	0.528	

Point Loads:		Span 1		Span 2		Span 3	
ULS:		a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
P ₁ (kN)		0.000	6.000				
P ₂ (kN)		0.000	0.000				
P ₃ (kN)		0.000	0.000				

SLS:		Span 1		Span 2		Span 3	
		a (m)	b (m)	a (m)	b (m)	a (m)	b (m)
P ₁ (kN)		0.000	6.000				
P ₂ (kN)		0.000	0.000				
P ₃ (kN)		0.000	0.000				

MATERIAL & SECTION PROPERTIES AND ANALYSIS RESULTS

Akritidis Group Building
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"Approved Plans and
Documentation"



Permit No.: 20150189/0
Issue Date: 25/02/2015

Ari Akritidis
BS-U 1573

INSPECTION BOOKINGS: 95682992

Section: 250 PFC

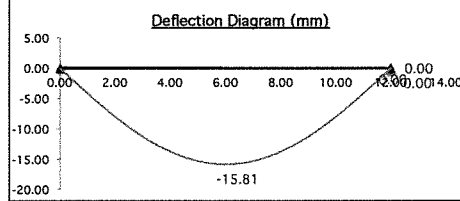
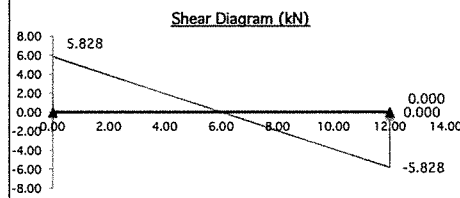
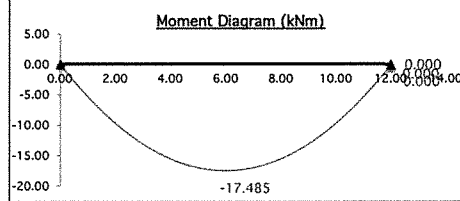
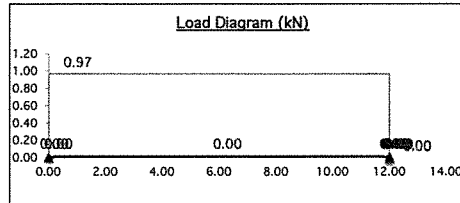
Designation	250 PFC
Mass per m (kg/m)	35.50
d (mm)	250.00
b _f (mm)	90.00
t _f (mm)	15.00
t _w (mm)	8.00
r ₁ (mm)	12.00
r _{ext} (mm)	-
d ₁ (mm)	220.00
d ₁ /t _w	27.50
(b _f t _w)/2t _f	5.47
A _g (mm ²)	4,520
J (mm ⁴)	238,000
I _w (mm ⁶)	3.59E+10
Form factor (k _f)	1
Flange f _y (MPa)	300
Web f _y (MPa)	320
E (MPa)	200,000
G (MPa)	80,000

About x-axis:

I _x (mm ⁴)	4.51E+07
Z _x (mm ³)	361,000
S _x (mm ³)	421,000
r _x (mm)	99.9
Compactness	-
Z _{xx} (mm ³)	421,000

About y-axis:

I _y (mm ⁴)	3.64E+06
Z _y (mm ³)	59,300
S _y (mm ³)	107,000
r _y (mm)	28.4
Compactness	-
Z _{yy} (mm ³)	88,700



Design Moments:	
Load case:	1.2G + 1.5Q
Design Span:	Span 1
M ₂	-13.114 kNm
M ₃	-17.485 kNm
M ₄	-13.114 kNm
M _m	-17.485 kNm

Design Shear Forces & Reactions:	
Design Span:	Span 1
V _{left}	5.828 kN
V _{right}	-5.828 kN
V _{max}	5.828 kN
R ₁	5.828 kN
R ₂	5.828 kN
R ₃	0.000 kN
R ₄	0.000 kN

Maximum Deflections:	
Load case:	G
Span 1	-15.81 mm
Span 2	0.00 mm
Span 3	0.00 mm

DESIGN CRITERIA

Effective Length Factors:	
Twist restraint, k _t	1.10
Load height, k _l	1.40
Lateral rotation, k _r	1.00
Segment length, l	0.90
Effective length (L _e)	1.39

Deflection Limits:

Mid-span deflection:		Overhang deflection:	
L/δ _{allowable}	300.00	L/δ _{allowable}	300.00
δ _{max}	12.00	δ _{max}	12.00
δ _{LIMIT} (mm)	12.00	δ _{LIMIT} (mm)	12.00

Bearing and Shear Input:	
Bearing length, b _f (mm)	90.00
b _y (mm)	0.00
Splayed depth (mm)	0.00

Moments for Calculation of α_m:

M _m (kNm)	-17.485
M ₂ (kNm)	-13.114
M ₃ (kNm)	-17.485
M ₄ (kNm)	-13.114

or

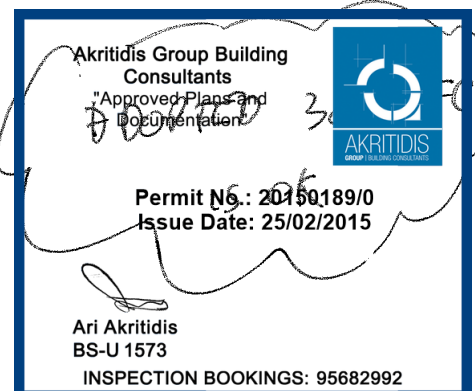
α _{m, manual}	0.00
β _{m, manual}	-1.00

NO USER INPUT REQUIRED BELOW THIS ROW

SUMMARY				
BENDING STRENGTH:				
oM _{xx} =	113.670 kNm	>	17.485 kNm	O.K.
oM _{yy} =	113.670 kNm	>	17.485 kNm	O.K.
WEB SHEAR STRENGTH:				
oV _u =	304.128 kN	>	5.828 kN	O.K.
oV _{rm} =	304.128 kN	>	5.828 kN	O.K.
WEB BEARING STRENGTH:				
oR _{by} =	367.200 kN	>	8.790 kN	O.K.
oR _{bb} =	343.276 kN	>	5.828 kN	O.K.
SERVICEABILITY:				
Span 1 δ _{MAX} =	15.813 mm	>	12.000 mm	Warning!
Span 2 δ _{MAX} =				
Span 3 δ _{MAX} =				

Gravity load case is

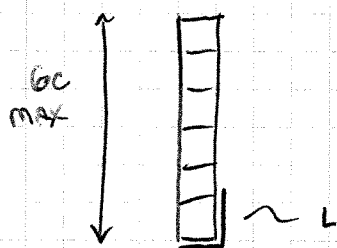
OK E.



ADDRESS: 4 FLORIDA AV, BEAMARIS	PROJ #: F14190	DES: BRN	DATE: 13/01/15
CLIENT: G. LORD	SHT #: 27 of 39	CHK: SB	DATE: 28/1/15
CALCULATION: LOAD ON LINTEL			COMMENTS / REF

$$G = 0.19 \text{ kPa} / 10 \text{ mm} + 0.01 \text{ kPa} / 1 \text{ mm} \quad 110 \text{ mm clay brick + render}$$

$$G = 0.2 \text{ kPa} \times \frac{110}{10} = 2.2 \text{ kPa} + 0.01 \text{ kPa} \times \frac{10}{1} = 2.3 \text{ kPa}$$



NO RLW $\therefore R_1 = 0 \text{ kPa}$

$$R_2 = 1.1 \text{ kN}$$

$$b_c = 520 \text{ mm MAX}$$

$$l_c = 86 \text{ mm}$$

$$LC1 = 1.2G + 1.5R_2 \Rightarrow 1.44 \text{ kN/m} + 1.65 \text{ kN}$$

$$LC2 = G \Rightarrow 1.196 \text{ kN/m}$$

Input into multiframe (self weight of member will be included in multiframe)

Akritidis Group Building Consultants
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Permit No.: 20150189/0
 Issue Date: 25/02/2015



Ari Akritidis
 BS-U 1573

INSPECTION BOOKINGS: 95682992



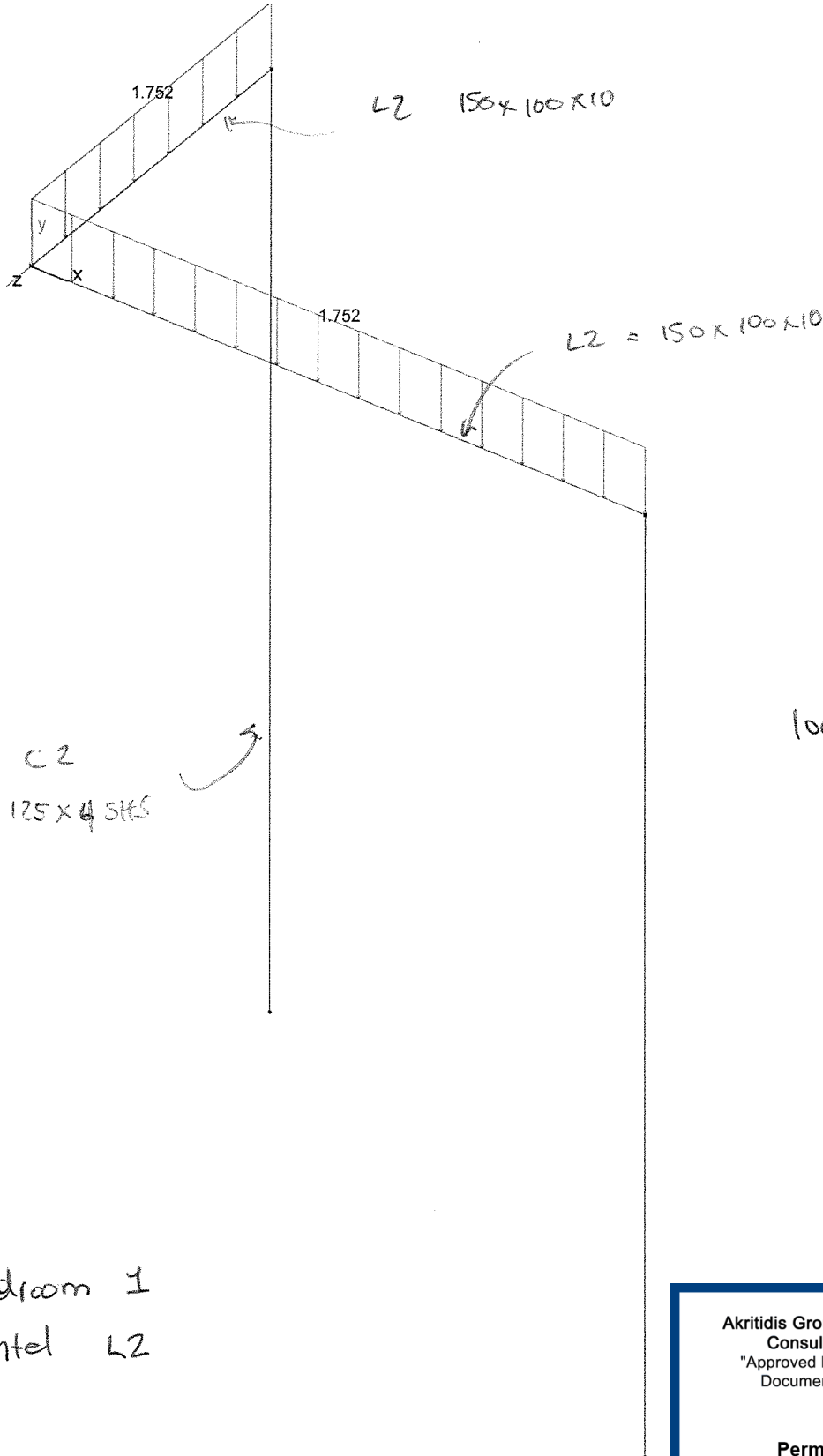
NOT FOR COMMERCIAL USE

SB Page 28



Tue, January 27, 2015
frame 15.04

C:\Documents and Settings\bnas\Desktop\Melbourne Jobs\F14190\L1.m...



Bedroom 1
Lintel L2

Load View - G

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Issue Date: 25/02/2015

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BS-U 1573

INSPECTION BOOKINGS: 95682992



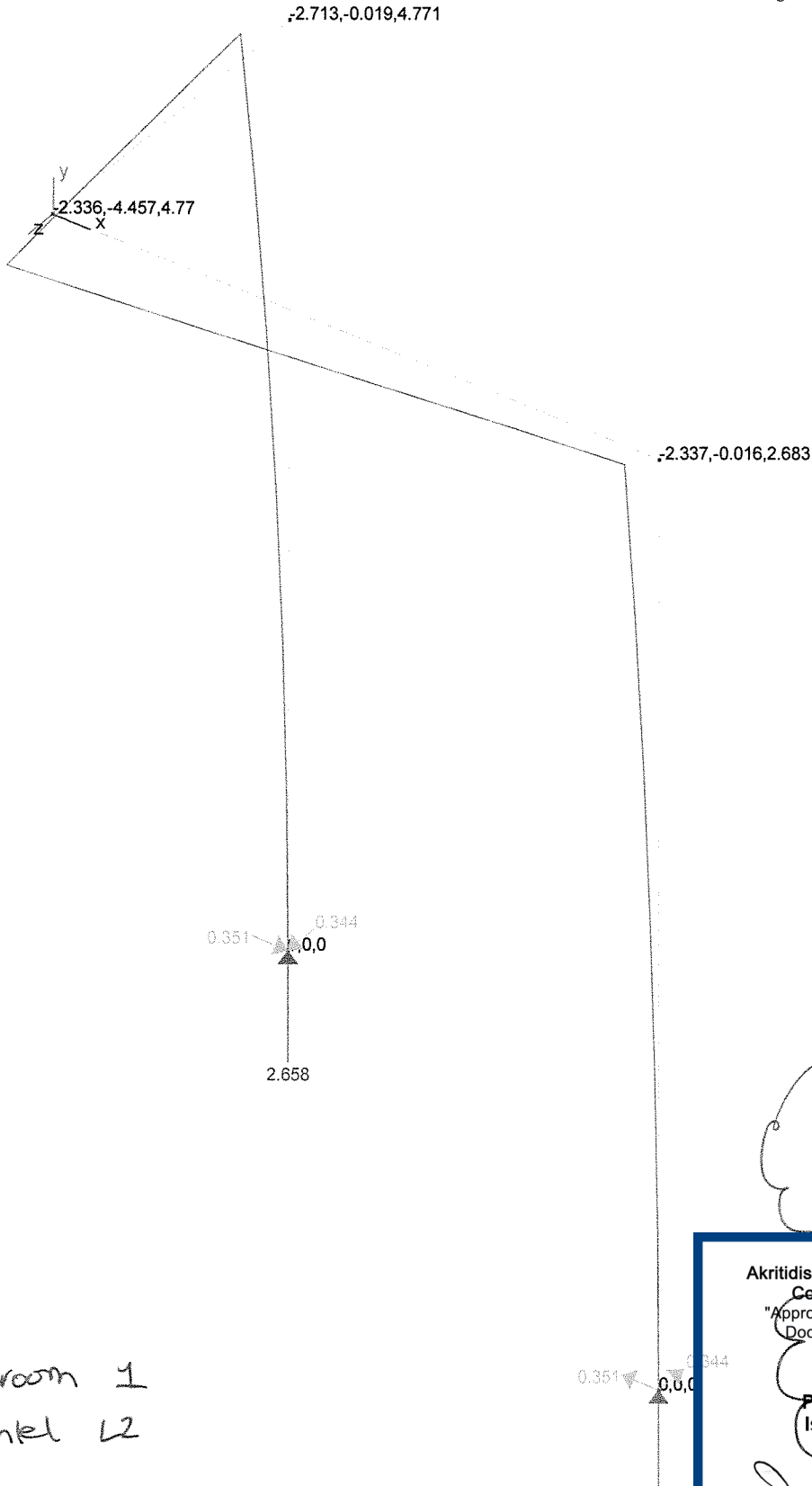
SB.



Tue Jan 27, 2015
frame 15.04

C:\Documents and Settings\bnasr\Desktop\Melbourne Jobs\F14190\L1

Page 29



Bedroom 1
Link L2

Plot View - Static Case: G Defl. (mm)

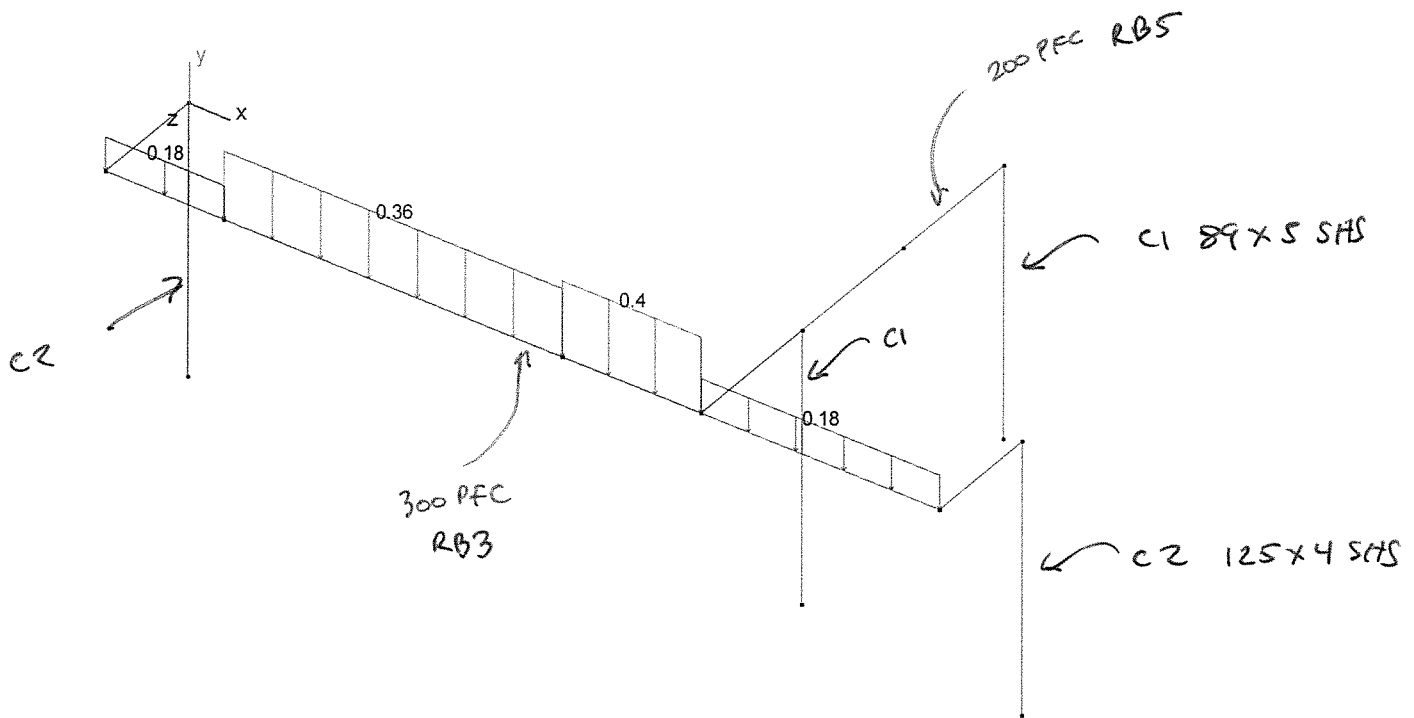
Akritidis Group Building Consultants
"Approved Plans and Documentation"
ADOPTED
Permit No.: 20150189/0
Issue Date: 25/02/2015
OK
Ari Akritidis
BS-U 1573
INSPECTION BOOKINGS: 95682992



Page 30

Sections	
☐	300PFC
☒	200PFC
☐	89x89x5.0 SHS
☐	125x125x6.0 SHS
Default Colour	
☒	All loads

FRONT PORCH CANOPY



Load View - Groof

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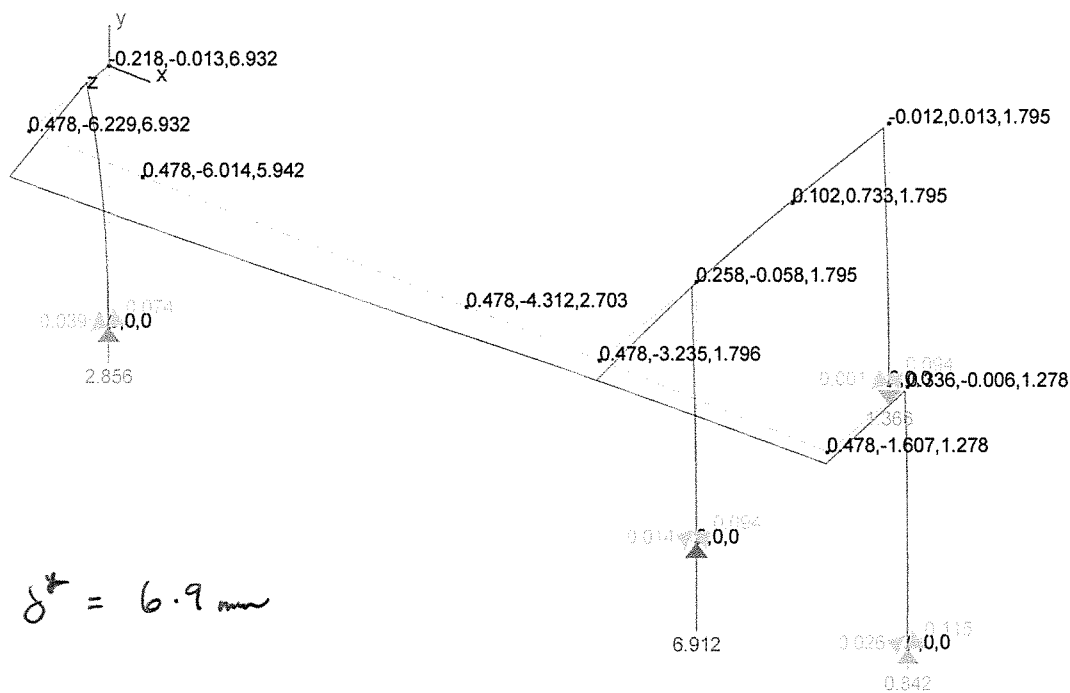
NOT FOR COMMERCIAL USE

SB Page 31



C:\Documents and Settings\bnas\Desktop\Melbourne Jobs\F14190\RB3 ...

FRONT PORCH CANOPY



$$\delta^* = 6.9 \text{ mm}$$

ADOPTED 300 PFC AS RB3 IS OK

ADOPTED 200 PFC AS RBS 11 OF

ADOPTED 125x6 S45 AS C 2 15 OK

AD 01750 87X5 8K5 AS C1 C5 OK

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Plot View - Static Case: Gtotal Defl. (mm)



NOT FOR COMMERCIAL USE

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January 27, 2015
frame 15.04

C:\Documents and Settings\bnasr\Desktop\Melbourne Jobs\F14190\west side canopy

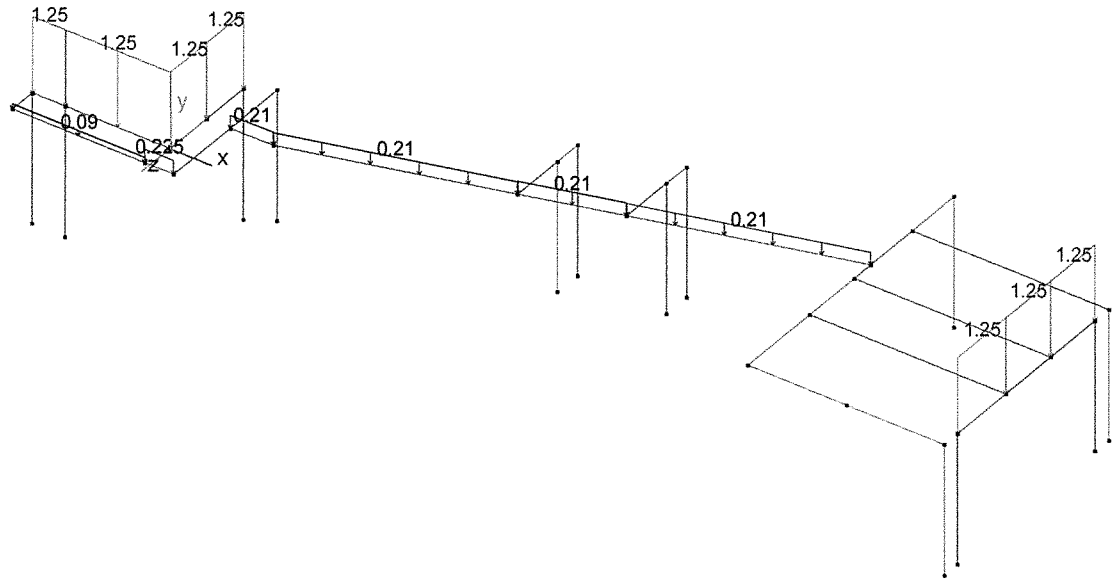
Sections

- 150x100x12
- 89x89x5.0 SHS
- 150x150x8.0 SHS
- 300PFC

Default Colour

- All loads

WEST SIDE CANOPY

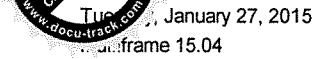


Load View - G

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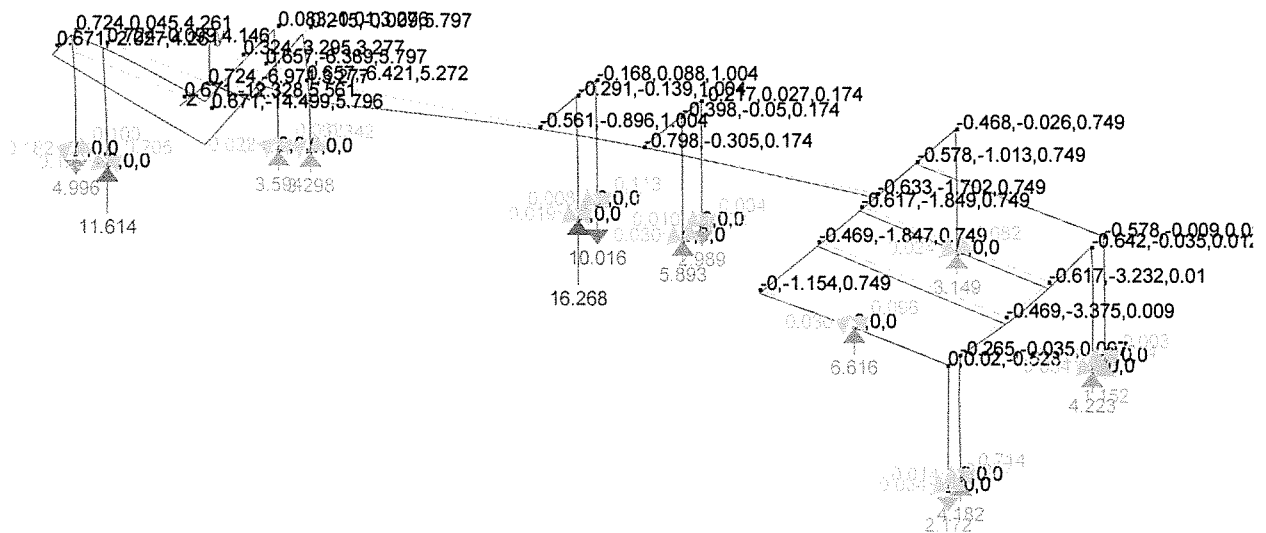
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WEST SIDE CANOPY

$$S^2 = 5.796$$



ADOPTED 300 VFC AS RB4 U OK

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T1

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SB 28.1.15.

T1.xlsx

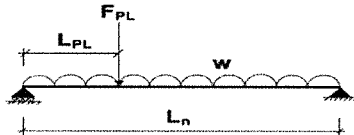
		FABRICATED STEEL BEAM DESIGN TO AS4100-1998	
1 Erindale Road Balcatta W.A. 6021 ph: (08) 9205 4500 fax: (08) 9205 4501 email: info@structerre.com.au		Issued: 21-Oct-11	
JOB ADDRESS:		PROJECT No:	
CLIENT:		SHEET No:	
		BY: DATE:	

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FREE BODY DIAGRAM



Note: L_{pl} is the distance of the point load to the nearest support

LEGEND

User input cell: Users can only input data into these cells
 Warnings/Comments: Red text indicates a warning or comment
 Black text: General text, no user input
 Red triangle: Red triangle indicates cell has comments by spreadsheet writer - float cursor over triangle to read

DETERMINE LOADS (Simply Supported Beam)

Dead Load				width/height	w: UDL Load Applied	Fpl = Point Load Applied
110 Brick+2x10 Ren	2.47 kPa	*		0 m	0	0
110+110 Brk+2x10 Ren	4.56 kPa	*		1.2 m	5.472 kN/m	0
90 Brick+2x10 Ren	2.09 kPa	*		0 m	0	0
Studwall	0.5 kPa	*		0 m	0	0
Roof Steel	0.4 kPa	*		0 m	0	0
Self Weight	0.39 kN/m	*		1	0.39 kN/m	0
Additional Load	0.2 kN/m	*	0.45	0	0.09 kN/m	0
					5.952 kN/m	0 kN

Live Load				width/height	Load Applied	Load Applied
Balcony (homes)	2 kPa	*		0 m	0	0
Floor (homes)	1.5 kPa	*		0 m	0	0
Roof	0.25 kPa	*		0 m	0	1.4 kN
Additional Load	0 kN/m	*	0	0	0	0
					0	1.4 kN

LOAD COMBINATIONS	Max Distributed Load	Max Point Load
Service F _d =DL+LL	5.95 kN/m	1.4 kN
Ultimate F _d =1.35DL	8.04 kN/m	0 kN
F _d =1.2DL+1.5LL	7.14 kN/m	2.1 kN
F _d =MAX F _d	8.04 kN/m	2.1 kN

AS/NZS 1170.0-2002

SECTION GEOMETRY

Top Flange	Plate width	0 mm	no top flange	Min. = N/A	mm	Min =	N/A	mm	
	Plate thickness	0 mm				Max =	N/A	mm	
	fy	300 MPa				Table 2.			
Web	Plate Height	250 mm	Web thickness O.K.	300 MPa	in tension	N/A mm	Min =	N/A mm	
	Plate Thickness	12 mm							Table 2.
	fy	300 MPa							Table 2.
Bottom Flange	Plate width	200 mm	in tension	Min. =	N/A mm	Max =	N/A mm	Table 2.	
	Plate thickness	10 mm							Table 2.
	fy	300 MPa							Table 2.

MEMBER GEOMETRY AND ACTIONS

Span	L _n	5.2 m				
	L _{pl} = L to Fpl =	2.8 m				
	M [*] = UDL	27.16 kNm				
	M [*] = Point Load	2.73 kNm				
	M [*] = Multiframe	0 kNm				
	M [*] =	29.89 kNm				

MEMBER CAPACITY

Restraints	L =	5.2 m				
	kl =	1				
	kr =	1				
	L _e = kl x L x kr x L	5.2 m				
	Moment Magnification Factor (α _m)	1.13				
	α _m Multiframe =	0.00				
	α _m user input =	1.13				

BENDING CAPACITY X-X AXIS	α _m Max	50.92 kNm				
	α _m Mb _x	33.71 kNm				

SHEAR CAPACITY	α _m V _v	486.00 kN				
	weld length	50 mm				

WELDS	Top flange to web	50 mm				
	Bottom flange to web	50 mm				
	Top flange to web	52184 N				
	Bottom flange to web	52184 N				

SERVICEABILITY

DEFLECTION LIMITS	Span/def	500				
	LL	250				
	DL+LL	500				
ACTUAL DEFLECTIONS	DL	659				
	LL	9109				
	DL+LL	615				
	DL+LL	29.21 10 ⁶ mm ⁴				

MATERIAL PROPERTIES

fy	300 MPa					
E	200000 MPa					
G	80000 MPa					

This is the minimum fy of all the flanges and web.

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Issue Date: 25/02/2015

250 x 10
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INSPECTION BOOKINGS: 95682062

200 x 10 FLANGE
AS T1 OK

ADDRESS: 4 FLORIDA AV. BEAUMARIS	PROJ #: F14190	DES: BEN	DATE: 13/01/15
CLIENT: LORD	SHT #: 35 of 39	CHK: AB	DATE: 28/01/15
CALCULATION: WIND RACKING LOADS			COMMENTS / REF

RACKING LOAD E-W (RL_{EW})

$$RL_{EW} = 1.26 \text{ kPa} \times 0.8 \times (0.7 + 0.5) \times \left(34.5 \text{ m} \times \frac{2.7 \text{ m}}{2} + 12 \text{ m} \times 2 \text{ m} \right)$$

$$RL_{EW} = 85 \text{ kN}$$

RACKING LOAD N-S (RL_{NS})

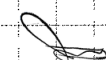
$$RL_{NS} = 1.26 \text{ kPa} \times 0.8 \times (0.7 + 0.5) \times \left(18.35 \text{ m} \times \frac{2.7 \text{ m}}{2} + 7.2 \times 2 \text{ m} \right)$$

$$RL_{NS} = 47 \text{ kN}$$

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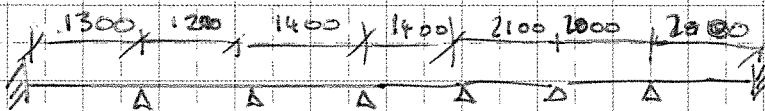
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Issue Date: 25/02/2015



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ADDRESS: 4 Florida Ave Beaumaris	PROJ #: F14190	DES: SB	DATE: 14 / 1 / 15.
CLIENT: G & A Lord.	SHT #: 36 of 39	CHK:	DATE: / /
CALCULATION: Suspended Edge Beam Design			COMMENTS / REF



RLW - 6.5m

Dead load.

$$\begin{aligned} \text{Roof} &= 6.5 \times 0.4 = 2.6 \text{ kN/m} \\ \text{Wall} &= 3.65 \times 2.35 = 8.58 \text{ kN/m} \\ \text{SW} &= 0.4 \times 0.3 \times 24 = 2.88 \text{ kN/m} \\ \text{Slab} &= 0.4 \times 24 \times 1.7 = 5.71 \text{ kN/m} \end{aligned}$$

$$\underline{\underline{19.77 \text{ kN/m}}}$$

live load

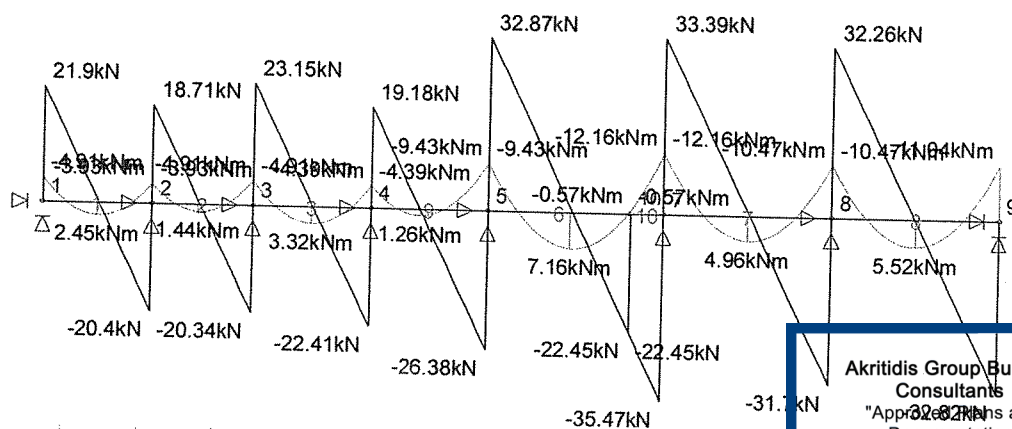
$$\begin{aligned} \text{Roof} &= 0.25 \times 6.5 = 1.63 \text{ kN} \\ \text{Slab} &= 1.7 \times 2.5 = 4.25 \text{ kN} \end{aligned}$$

Import into SpaceGass.

$$\underline{\underline{5.88 \text{ kN/m}}}$$

@ support $M^* = 12.16 \text{ kN.m}$
 $V^* = 22.48 \text{ kN}$

@ midspan -7.16 kN.m M^*
 $OKN = V^*$



Import into Conc Beam spread sheet.

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CONSULTING ENGINEERS

PROJECT 4 Florida Ave Beaumaris
 TITLE Suspended slab edge beam

PAGE No

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PREPARED SB

CHECKED MA

DATE

DATE

Jan-15

Reinforced Concrete Beam Design to AS 3600 -94

For Rectangular Beam Sections ONLY

AT Support**Mid Span**

M* = -12.16 kN.m M* = 7.16 kN.m
 V* = 22.45 kN V* = 0 kN
 N* = 0 kN ((+)compression,(-) tension)

Section Dimensions

bw = 300 mm bef = 300 mm
 D (overall) = 500 mm D (overall) = 500 mm
 Strength f_c = 25
 f_{sy} = 500

Flexural Reinforcement

Bar Dia = 12 mm
 No Bars = 3
 Cover = 50 mm
 Ast = 267 mm²

Flexural Reinforcement

Bar Dia = 12 mm
 No Bars = 3
 Cover = 50 mm
 Ast = 267 mm²

Shear Reinforcement

Bar Dia = 0 mm
 No Bars = 3
 Asv = 0 mm²

Shear Reinforcement

Bar Dia = 0 mm
 No Bars = 2
 Asv = 0 mm²

Bending Capacity

d = 444 mm
 γ = 0.85
 k_u = 0.05
 ϕM_{uo} = 46.3 kN.m
 $M^*/\phi M_{uo}$ = -0.26

Bending Capacity

d = 444 mm
 γ = 0.85
 k_u = 0.05
 ϕM_{uo} = 46.3 kN.m
 $M^*/\phi M_{uo}$ = 0.15

O.K. For Bending

O.K. For Bending

Minimum Steel Ratio

f_{cf} = 3.00 MPa
 Z = 12.50 E6mm⁴
 $1.2M_{cr}$ = 45.00 kN.m
 $1.2M_{cr}/M_{uo}$ = 0.78

Minimum Steel Ratio

f_{cf} = 3.00 MPa
 Z = 12.50 E6mm⁴
 $1.2M_{cr}$ = 45.00
 $1.2M_{cr}/M_{uo}$ = 0.78

Min Steel O.K

Min Steel O.K

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 Issue Date: 25/02/2015

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PROJECT 4 Florida Ave Beaumaris
TITLE Suspended slab edge beam

PAGE No 0
JOB No 0
PREPARED SB DATE Jan-15
CHECKED MA DATE

Shear Capacity

$\beta_1 = 1.2716$
 $\beta_2 = 1.00$
 $V_{uc} = 62 \text{ kN}$
 $\phi V_{uc} = 44 \text{ kN}$
 $0.5\phi V_{uc} = 21.86 \text{ kN}$ within 3% no shear reo required
 $V_{u,max} = 666 \text{ kN}$
 $\phi V_{u,max} = 466 \text{ kN}$
 $V_{u,min} = 142 \text{ kN}$
 $\phi V_{u,min} = 100 \text{ kN}$
 $\theta_v = 30.0$

Min Steel Governs therefore use 2 Set(s) of Y0 @ 0 CRS

Servicability Parameters

$E_c = 27600 \text{ MPa}$ $\Delta/L_{ef} = 0.002$ @ Mid Span Asc = 770 mm^2
 $I_{ef} = 0.001182 \text{ m}^4$ $\psi_s = 0.7$ $kcs = 0.80$
 $L_{ef} = 2200 \text{ mm}$ $I = 0.4$
 Loads $k_1 = 0.007$
 $DL - UDL = 19.77 \text{ kN/m}$ $k_2 = 0.004$
 $LL - UDL = 5.88 \text{ kN/m}$
 $F_{def} = 41.5836$
 $d_{min} = 243.53$

Servicability O.K

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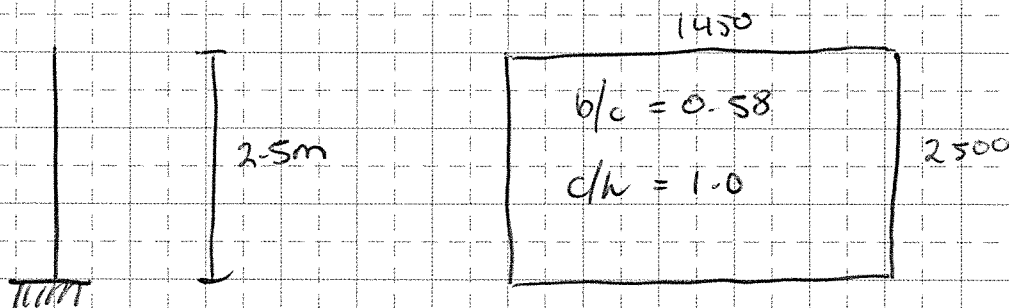


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Issue Date: 25/02/2015

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INSPECTION BOOKINGS: 95682992

ADDRESS: 11 FLORENCE AV. DEANUMPTIS	PROJ #: F14190	DES: BRN	DATE: 13 / 01 / 15
CLIENT: G. LORD	SHT #: 39 of 39	CHK: SB	DATE: 28 / 1 / 15
CALCULATION: F2 FOOTING			COMMENTS / REF



$$C_{pa} = 1.3 + 0.5 (0.3 + \log_{10}(0.58) (0.8 - 1))$$

$$C_{pa} = 1.47$$

$$\text{Reg A Cut 2} = 1.26 \text{ kPa}$$

$$p = 1.26 \text{ kPa} \times 1.47 = 1.85 \text{ kPa}$$

$$w^* = 1.85 \times \frac{1.45 \text{ m}}{1.0 \text{ m}} = 2.69 \text{ kPa}$$

$$m^* = \frac{w \cdot l^2}{2} = 8.41 \text{ kNm/m} \quad \text{at base}$$

Resisting

doble brack wall

$$W = 4.56 \text{ kPa} \times 2.5 \text{ m} \times 1.45 \text{ m} = 16.53 \text{ kN}$$

footing

$$W = 24 \text{ kPa} \times 1.45 \times 0.45 \text{ m} \times \text{m}$$

$$W_{\text{form}} = 32.19 \text{ kN} / 1.45 \text{ m}$$

$$\text{Resisting Moment} = 22.2 \times 0.45 > 8.41$$

$$0.45 > 8.41$$

ADOPT 1450 X 250 X 450mm deep

